STATE OF CALIFORNIA

ENERGY RESOURCES CONSERVATION

AND DEVELOPMENT COMMISSION

SUPPLY and COST of ALTERNATIVES to MTBE in GASOLINE	Docket No. 96-FR-1

Public Hearing of the

Fuels and Transportation Committee

Friday, November 13, 1998

9:00 a.m.

Held at the:

California Energy Commission

1516 Ninth Street, Hearing Room A

Sacramento, California 95814-5512

Reported by: George Palmer

COMMISSIONERS PRESENT

JANANNE SHARPLESS, Presiding Member

MICHAL C. MOORE, Second Member

STAFF PARTICIPANTS
(alphabetically listed)

SUSAN BAKKER, Advisor to Commissioner Moore

CLAUDIA CHANDLER, Public Information Person

TOM GLAVIANO, Project Manager

YVONNE NELSON

GORDON SCHREMP, Technical Project Manager

ROSELLA SHAPIRO, Advisor to Commissioner Sharpless

SHERRY STONER

INDUSTRY PARTICIPANTS
(alphabetically listed)

AARON BRADY, Energy Security Analysis, Incorporated

DUANE BORDVICK, Vice President, Tosco Corporation

DAN CHANG, Ph.D., Chair of the Civil and Environmental Engineering Department at U.C. Davis

DAVID HIRSHFELD, MathPro

CAL HODGE, President, A 2nd Opinion

MIKE KULAKOWSKI, Equilon Enterprises

NEIL KOEHLER, Parallel Products

JEFFREY A. KOLB, Ph.D., Economist, MathPro

JOHN LYNN, American Methanol Institute

ED MANNING, Kahl Pownall Advocates, for the Western States Petroleum Association

CHARLES MORGAN, Mobil

MARY MORGAN, Kinder-Morgan Energy Partners

MEGAN SMITH, Director, American Bioenergy Association

JOHN VAUTRAIN, Vice President of Purvin & Gertz

AL ZUSTOVICH, Exxon

I N D E X

Friday, November 13, 1998 9:17 o'clock

P R O C E E D I N G S

PRESIDING COMMISSIONER SHARPLESS: Good morning. If I could have you take your seats.

I want to welcome you to the California Energy Commission, the Fuels and Transportation Committee Hearing today. And I'd like to begin with introductions.

My name Is Jan Sharpless, and I'm the Presiding Member here at the Energy Commission on the Fuels and Transportation Committee, which is the Committee that has been overseeing the Energy Commission's effort here on the MTBE study, our part of the study.

And to my left is Commissioner Michal Moore, who is the Second Member of the Committee. And to his left is Susan Bakker, his Advisor. To my right is Rosella Shapiro, my Advisor.

I'd also like to introduce our Staff, who will then later on in the Agenda introduce the other individuals who will be making presentations regarding this report.

I'll start with Tom Glaviano, who's been the Project Manager. Tom, raise your hand, in case you don't all know him, and Gordon Schremp. We also have some other Staff people that I would like to recognize, Sherry Stoner, Yvonne Nelson.

These four people have done yeoman work in putting together this report, working with the consultants and dealing with the multiplicity of complex issues. This has been a very major task for this organization spanning over the last several months. And obviously we could not have done it without our very able and capable Staff people who sit here before you. They will be part of the presentation this morning.

I'd like to begin by stating what the purpose of this meeting is. The purpose of this meeting is for this Committee to hear comments from the interested public on the

findings, the assumptions and the methodologies of the Commission Staff Report on MTBE Supply and Price.

Now this report is a part of a larger effort that has been undertaken by the state of California to look into the issue of MTBE as an oxygenate and alternatives if MTBE is be discontinued, the impacts it would have on California's ability to meet its production, and where the supply might come from if an alternative were chosen and what price implications that would have on the consumer.

I do recognize, although I was out of town yesterday and read in the paper this morning, that the U.C. study has now become public. And there was a front-page article in the Sacramento *Bee* on it this morning. I read with great interest.

I was looking forward to the results of this study because obviously they complement our study. Our study did not look at health effects, although it did look at air pollution impacts, if you were to choose the alternatives against MTBE.

Today's hearing is not about the U.C. report. However, we will have an individual from U.C. Campus, I believe, who will come in and review some of its findings.

But in the paper this morning it indicated that this hearing was going to delve into the details of the U.C. report, and that is not the case.

The case is that this Committee is looking for testimony from the impacted and interested parties on our findings, on our assumptions, on our methodologies.

This report then will be considered by the Committee and a recommendation will go to the full Commission and will become finalized.

Another aspect of this report is the information in this report will feed into another report we've been undertaking for the last several months called the Fuels Report. It looks at the much broader issues. It's a policy document. This is not a policy document. This document is a finding document that will be used in a number of different arenas.

So with that I'd like to talk a little bit about process. Some of you who are familiar with the way the Energy Commission operates know that in order to proceed through an orderly hearing we have individuals interested in testifying before the Commission make out blue cards. Some of you have already made out blue cards. I have about five of them before me.

If you would like to make comment to the Commission, I would encourage you to make out these blue cards. If something being said, and you have not yet made out a blue card, prompts you to want to speak to the Commission, then please make out a blue card. Lana is our person who's going to be handling that process, and we'd appreciate it if you could do that.

I'd like to ask Commissioner Moore is there are any comments he would like to make.

COMMISSIONER MOORE: The only comment I'd like to make is that I'm looking forward to the comments today. And I want to stress that where people have had access to the Staff and to the methodology that we've used over a long period of time and where you differ with that, I'd like to hear specifically why you differ, and why those comments weren't, you think, included in the process as it went forward, because we had a very wide-ranging effort made to try and include everyone, included everyone's critique of the comments.

So if you've got a problem with the methodology that we used and, frankly, I see in the written comments that are submitted, that I hadn't seen prior to this morning, some references to differences in opinion about the methodology used or differences in opinion about some of the conclusions drawn from that.

I want to make sure that you include in your comments the reason that you think we went wrong at the front end, and why your comments were not included at that point,

because as far as I know we made a great effort to get everyone's opinion at that point. So I'll be very interested in that range of opinion.

PRESIDING COMMISSIONER SHARPLESS: Thank you, Commissioner Moore. That's actually a very good point, and I'm glad that you've made it at the beginning.

I'd like to now, if I haven't forgotten any details, Mr. Glaviano, is there anything else I should cover before we turn to the presentations?

MR. GLAVIANO: Yes. Just before we turn it over to Gordon Schremp to make his presentation, that the information that this record and this transcript can be found on is going to be Docket Number 96-FR-1. This will be probably where you can find all the documents that are given to us today. And the transcript will be in Dockets under 96-FR-1 and become part of the Fuels Report record.

Thank you.

PRESIDING COMMISSIONER SHARPLESS: Thank you. That is important. We do base our findings on the record that we build. And we have taken the comments that have been submitted today plus comments before today. And that does become part of the record. I believe, right now, we are live in the Internet; is that right?

MS. CHANDLER: Yes.

PRESIDING COMMISSIONER SHARPLESS: Claudia Chandler, our Public Information person, is saying that is right. And so we have an opportunity to get immediate feedback from those who are plugged into us. So we have marched into the computer/electronic age, and we're thrilled about it.

Anyway, I'll turn it over to Tom. Tom, could you make the introductions before Gordon starts or, Gordon, are you doing that?

MR. GLAVIANO: Yes.

PRESIDING COMMISSIONER SHARPLESS: Of the consultants at the table?

MR. GLAVIANO: Yes, I have the privilege of introducing, of course, Gordon Schremp, who's going to make the presentation on the overview of our work.

We have John Vautrain, from Purvin & Gertz, who will be discussing the import, the cost curves for oxygenates.

We have Aaron Brady, from ESAI, Incorporated, which will do a presentation on the oxygenate cost.

And over here is Dave Hirshfeld and Jeff Kolb, from MathPro, Incorporated, who did the modeling for us.

So with that I'd like to turn it over to Gordon. And actually I did a pretty good job of remembering names.

PRESIDING COMMISSIONER SHARPLESS: Given your age.

MR. GLAVIANO: Given my track record, yes.

MR. SCHREMP: Thank you, Commissioner Sharpless and Tom.

Today my presentation will include an overview of our study, what the design was, what the scope of the work involved, the three contractors that Tom just mentioned, as well as the key findings of our study.

A little bit of background. Well over a year ago, in May of 1997 there was a hearing over at the Capitol. There was at that time a big push to investigate the presence of MTBE in groundwater; how prevalent was it, what type of risk that was? And there was some movement afoot to incorporate an immediate ban for that particular gasoline-blending component.

We gave testimony at that hearing and recommended that if there was an immediate ban of MTBE that the consequences would be drastic for production capacity in California. Somewhere along the lines of a 15- to 40-percent shortfall in production capacity.

And subsequent to that hearing there was some budgetary language inserted into the state budget that set aside $300,000 for the Energy Commission to study what would happen if MTBE were phased out of gasoline in California.

The focus of that report, as Commissioner Sharpless mentioned, was what would be the impact on supply and cost to consumers? And that is the main thrust of our findings, is to examine that.

And we looked at that over three different time periods: an immediate ban, intermediate time period and a long-term time period.

I'll go into the design of our study. We had what we call as scenario approach or, as you'll read the report itself, we break down the investigation into various cases. And we also have the time periods that I'll describe in just a moment.

The main objective was to determine what would be the impact on cost for gasoline to consumers. And so most of the findings draw people looking at that conclusion.

The scenario approach, or as we referred to it as cases, I think there's three main categories that we group these cases into. They phase out MTBE and use an alternative oxygenate.

Another set of cases was to produce gasoline without any oxygenates at all, which is possible using CARB's predictive model.

The third grouping was to reduce the amount of oxygenates used, specifically MTBE, by allowing removal of the federal minimum oxygen requirement that is for all ozone nonattainment areas in California.

The time periods I mentioned. Near term, which we refer to as an immediate ban. We looked at what limiting factors were involved trying to go to an alternative oxygenate and what difficulties would be entailed.

Intermediate term is considered to be three years. And some of the assumptions are that minor refinery modifications would be allowed but no major modifications. And

oxygenate capacity could be expanded from idle plants ramping up, some minor expansions, and certain oxygenate plants converting to another type of oxygenate production.

Long-term is three years further out. That is six years. And major refinery modifications are permitted. Time will be adequate to do such. And new oxygenate production capacity can be built. We refer to those as grass-roots plants, brand new facilities.

Some of the factors that go into determining what a change in average cost could be. And we say change because, as you will see and you've already seen in some of the cases, the change is negative or a savings to consumers.

Some of these factors are the cost of alternative alternate oxygenate used in place of MTBE. Other factors are imports of either gasoline or some desirable gasoline blending components, as well as refinery modifications, most particularly in the long-term time period, as well as terminal improvements. And that could be terminals that are at wharfs and marine facilities, or downstream in the refineries and throughout the distribution system.

So that was our design of the study and that was our approach. And we decided to break that workload up into four main areas.

One is the availability of alternative oxygenates.

And following my presentation Aaron Brady of ESAI, or Energy Security Analysis Incorporated, will go into greater detail what his findings were.

Following me will be John Vautrain from Purvin & Gertz. And he looked at imports of gasoline and other gasoline-blending components, as well was assessing the marine terminal infrastructure, how much additional imports can be handled, are there sufficient tankers, et cetera.

Refinery production capability. MathPro develop a mathematical model to examine that. And they will be following John Vautrain in the presentation.

Impacts on air quality. We were also charged at assessing whether or not the use of an alternative oxygenate to MTBE would increase air pollution. And we work closely with the California Air Resources Board. And I believe Dean Simeroth is here today and is able to respond to questions in that area. I'll go into more detail on what the findings are in particular for air quality later on in my presentation.

As I mentioned Aaron Brady, with Energy Security Analysis Incorporated, looked at alternative oxygenates. And we selected four different oxygenates to examine. And those are two alcohols and two ethers.

The alcohols are ethanol and tertiary butyl alcohol. And I think everybody is familiar with ethanol. But TB alcohol is something people have not heard very much about. Essentially you add water and ether plant to make that compound.

The two ethers, ETBE and TAME. ETBE is ethyl tertiary butyl ether. And that can be made at an existing MTBE plant. All you do, instead of adding methanol, you add ethanol to make of that particular ether. And TAME is tertiary amyl methyl ether. And that is a byproduct of refinery operations at specific facilities. It's not a lot of production. There aren't really any grass-roots facilities. But we still examined that as a viable alternative.

Now the purpose was for us to examine what is the current assessment of supply for these various alternative oxygenates and what additional capacity or supplies can be brought along and how soon? And Aaron will talk about that a little bit later.

To get this we developed what we call supply cost curves. And essentially that looks at varying volumes that could be brought into the state at different prices. And the more volume you import into California, or the greater demand you have for a particular oxygenate, the higher the cost will be to the user.

Intermediate long-term time periods: As I mentioned earlier, in intermediate time period you can bring back idle plants that are temporarily not operating because the demand is it not sufficient. You can expand capacity at some facilities and you can convert,

say, for example, MTBE plants to produce ETBE and TBA. In the long-term we looked at new plants being produced.

Distribution infrastructure. Aaron also looked at what it would entail to use alternative oxygenates at different terminals throughout California, as well as the refineries. And I'll go over those results a little bit later.

Gasoline import. John Vautrain of Purvin & Gertz performed this analysis. He looked at it -- well, gasoline imports. First of all, California does import gasoline and valuable blending components to balance out the supply in the state.

In our analysis, in some of the cases we ran, substantial increases in imports were necessary to achieve a supply demand balance. John examined over 700 refineries worldwide to assess their capability to produce additional gasoline or -- alcoholates is one of the desirable blending components or the main desirable blending component he examined.

Once again, we constructed supply cost curves for this work. And the more volume you want to import to the state the higher the cost for that the material.

Marine transportation infrastructure. We looked at wharf space, offloading rates for the ships, tankage, segregated tankage on shore to handle additional imports of either oxygenates, gasoline or gasoline-blending components.

And in some cases the refinery modeling results indicate that certain gasoline-blending components would have to be exported from the state, that they would be less desirable or difficult to use in making the new gasoline with an alternative oxygenate or no oxygenate.

This brings us to the refinery modeling. David and Jeff performed this analysis. And the purpose was to come up with a tool, an analytical tool, we could use to examine what would be the impact on average cost to make gasoline.

The mathematical refinery model represents the state's refining capability in total. It's not a collection of individual refinery models, but one large refinery model.

They developed what we call a base case for the intermediate and long-term time periods. An intermediate time period, they are producing 965,000 barrels a day of gasoline.

And in the long-term or six year time period, they're producing 1,022,000 barrels a day of gasoline.

And it was from these base case runs that they developed a cost to make gasoline at those future time periods. And that is used for the basis of a comparison when we ran our other cases. So the results of the cases came up with a particular cost in total that was compared to the base case. And that difference is the cent-per-gallon numbers presented in our Table 1 of the Executive Summary.

I mentioned the California Air Resources Board was involved in the analyses of their quality impacts or potential air quality impacts. All cases that we ran using alternative oxygenates and, in fact, no oxygenates, were complying blends of fuel, meaning that they passed ARB's predictive model, a computer model that estimates tail pipe emissions based on the quality of the fuel being produced.

There was one exception to that. We ran a case that we call a one-pound volatility waiver. Gasoline during the summer months in California cannot exceed eight pounds of volatility. That's a measure of how easily it evaporates. In the modeling we looked at a one-pound waiver and we produced a gasoline with ethanol at 10 percent by volume that had an RVP that did not exceed nine -- or, excuse me. I think
I misspoke --

PRESIDING COMMISSIONER SHARPLESS: Seven, seven and eight.

MR. SCHREMP: I believe seven is the summertime cap for RVP, and the one-pound waiver went up to eight.

PRESIDING COMMISSIONER SHARPLESS: Right.

MR. SCHREMP: In that case ARB, I believe, on December 10th their board will be deciding or, I guess, debating the merits of their study they had just completed involving 12 cars that did, in fact, measure emissions, both tailpipe and evaporative, from using a blend of gasoline that contained 10-percent ethanol.

And Dean, I believe, would be able to respond to questions on that study. So this matter is not closed. But the preliminary test results indicate that air pollution would, in fact, increase compared to the base gasoline using MTBE if, in fact, there was a one-pound waiver.

Key findings. I think most importantly an immediate ban on MTBE in California or immediate phase-out would be a drastic and catastrophic impact on consumers. We found that phasing out MTBE over a three-year time period would be costly, but it is feasible to do.

And the longer the time period allowed, and our six year shows that it is the least costly approach to phasing out MTBE. And I'll go over each of the various alternative oxygenates, as well as the no-oxygenate and the HR 630 or reduced oxygenate cases individually and show you some of the highlights of those findings.

For ethanol, intermediate, term we see a cost increase of 6.1 to 6.7 cents per gallon. That's in the neighborhood of 900 to $990 million.

To do that we used 75,000 barrels a day of ethanol, blending in about 2.7 weight percent in the gasoline. And as you can see we had to import additional volumes of gasoline and gasoline-blending components to balance out supply. And that was in the neighborhood of 142,000 barrels per day.

In the long-term the cost declined by two to two and a half cents per gallon, or 300 to $400 million per year. And we increased the amount of ethanol in use because, of course, there's a higher demand at that time, a later time period.

And you can see the imports of gasoline do drop down to 113,000 barrels per day.

A variation of looking at ethanol in gasoline displacing MTBE is just one pound of volatility waiver that I did mention. The costs are less than the ethanol case alone, 5.4 cents per gallon, or approximately $800 million per year.

More ethanol is indicated because it is blended at a 10-percent volume or 3.5 weight percent oxygen. And additional gasoline imports do drop to 50,000 barrels per day. In the long-term that cost drops to one cent per gallon or $160 million per year. And there are 103,000 barrels a day of ethanol as you can see. And imports do decline to a little under 40,000 barrels per day.

One of the ethers, as an alternative to MTBE, is ethyl tertiary butyl ether. Intermediate-term results indicate a cost 2.4 to 2.5 cents per gallon or approximately $365 million. More ETBE is required because it contains less oxygen than MTBE. So that's why you see 129,000 barrels compared to, say, 108,000 barrels of MTBE. No additional gasoline imports are required. That's an important finding of this. And ETBE can be used as a substitute for the use of MTBE, and no gasoline imports will be required.

That is also the case in the long-term, and there is actually no change in cost compared to the base case using MTBE.

One of the other alcohols, TBA or tert butyl alcohol, the costs are about one-half to one and a half cents per gallon, or 75 to a little over $200 million per year. Approximately 90,000 barrels a day of TBA would be required to oxygenate the gasoline. And imports are only 22,000 barrels per day, or additional imports.

In the long-term the cost decline to .3 to 1 cent per gallon. So at most, $160 million. And a slightly greater amount of TBA or a little over 100,000 barrels per day. And imports, once again, drop in the long-term a little bit more.

We felt, when we drew up a list of cases to examine, that it's possible refiners could use a mixture of oxygenates. And so we grouped those cases into something we call mixed oxygenates. And that's looking at an economically optimal combination of ETBE, TBA and TAME.

And, as I mentioned, the production of TAME is limited by feedstock availability at refineries. And, as it turns out, and Aaron might touch on this in his presentation later, the supply cost curves for TAME were a bit more expensive than those of ETBE and TBA.

As a result of that in the modeling that Dave and Jeff performed, no TAME was selected to be used in this mixed oxygenate scenario.

So the combination that you see up on the slides of ETBE and TBA are just that. There are no TAME used in the mixed oxygenate scenario whatsoever.

These costs are lower, either a decrease of .2 cents or an increase of .2 cents in the intermediate term, which is about $30 million savings or expense. Like I said, over 100,000 barrels a day of the two oxygenates were used. And no additional gasoline imports were required, as is the case with the ETBE.

In the long-term the decrease in cost is a little bit greater, .3 to .4 cents per gallon, or 50 to $65 million in savings. A hundred and twenty-six thousand barrels per day of the two oxygenates were used and, once again, no additional imports required.

I think a lot of people may have heard a piece of legislation referred to as a Bilbray bill. And that is what we call HR 630. And I think the main focus of that bill is to remove the federal minimum oxygen requirement.

Currently the federal government requires a minimum 1.8 weight percent oxygen content in reformulated gasoline in all ozone nonattainment areas. Those would be federal areas. And those areas do include Sacramento, the Los Angeles Air Basin and San Diego.

So we looked at what would happen if legislation was passed and refiners could use less than that minimum 1.8 weight percent. As I mentioned earlier, using the Air Resources Board predictive model, in theory you can produce gasoline with less than the minimum oxygen content.

And, in fact, two companies that produce gasoline in the San Francisco Bay Area are making some volume of their regular grade without any oxygenates at this time. As you can see, it is possible to do. And they might speak to that later on today.

The results indicate that there would be a decrease of .2 to .8 cents per gallon or 30 to $120 million. MTBE use declines about one-third or 31 percent. But an additional 20,000 barrels a day of gasoline imports would be required to balance out supply.

In the long-term the savings can be greater, .3 to 1.5 cents per gallon, or 50 to $235 million. MTBE use does not decline as much, down 21 percent, and the imports are a little bit less at about 10,000 barrels per day.

Well, that leads us into not using any oxygenates at all. Once again, you can in theory produce gasoline without any oxygenates in California. Our modeling results looked at that.

The blends of gasoline produced in our modeling results were complying with air quality regulations. We did not increase emissions. These costs increased from 4.3 to 8.8 cents per gallon or 640 million to $1.3 billion per year.

As you can see, in the intermediate term a substantial volume of import would be required to balance out supply, in excess of 350,000 barrels per day.

In the long-term the cost increase declines to .9 or about 3.7 cents per gallon, or up to $580 million per year. And the volume of additional gasoline imports drops by 50 percent to below 170,000 barrels per day.

This is a good segue into what would happen with all those additional imports. And John Vautrain examined the marine terminal infrastructure. And as far as we can tell there is sufficient capacity to handle additional volumes of imports.

One exception was the previous no oxygenates case where there are in excess of 350,000 barrels a day of imports. And that is of concern. They will handle and segregate that large volume of additional imports.

The marine vessels. Are there enough clean tankers or tankers that can carry gasoline or gasoline components which are different from tankers that carry crude oil? If supplies were brought in from a foreign country, there is an adequate volume of ships to handle a large volume of additional imports. That is not a problem. If, in fact, these additional gasoline volumes or gasoline-blending components were to come from another U.S. port, federal law requires that U.S. flagship transport that material or a Jones Act vessel. There is a finite supply of these vessels, and they're in high demand. And I believe that is a concern that if a lot of this volume was expected to flow from one U.S. port into California, additional tankers may have to be built to handle the additional demand.

The distribution infrastructure. And I think that refers to the location where the tanker truck picks up the gasoline prior to delivering to the service station. And we call these locations terminals. And those can be located at a refinery, or at another marine facility, or a land-locked area that can be connected by rail or connected by pipeline that pumps product to those various locations.

No modifications are necessary to use another alternative oxygenate, except for ethanol. When we examined the terminals we found that the cost incurred to upgrade these terminals to be able to distribute ethanol were in the order of $60 million in total. And as you can see the additional cost is only about .1 cent per gallon. So it's not as significant as some of the other improvements that would have to be made to produce different types of gasolines.

Now the limiting factor here is the two years to perform these upgrades. In a lot of cases the terminals need in-line blending equipment to combine the ethanol and gasoline into the truck at the same time or in sequence. Over half the terminals do not currently possess this capability. And it would take time to make these upgrades, as well as upgrading the facilities to receive ethanol. That would be on the order of $19 million either by tanker truck or by rail. And to segregate the storage tanks to store ethanol separately, that would include about $16 million in modifications. The most of it would be for new tankage.

And the blending equipment I mentioned, that is very important to be able to mix the ethanol into the tanker truck, is on the order of about $25 million in capital expenditures.

And I'd like to close my remarks with a summary of some of the more important items that I've gone through. Once again, to reiterate an immediate phase-out of MTBE, without suspension of state and federal regulations, would be unfeasible.

An intermediate phase-out could cost up to 6.7 cents per gallon if you use an alternative oxygenate, or as high as 8.8 cents per gallon if you used no oxygenates at all.

In the long-term, once again least costly and a savings in some cases. The cost could be a little bit less than four cents per gallon if no oxygenates were used in the long-term.

The HR 630 case, or reduction in the amount of oxygen, or oxygenate used in the fuel is beneficial in all cases in any time period.

As Commissioner Sharpless spoke during her opening remarks, our study's focus is to look at the impacts of phasing out MTBE on supply and cost of gasoline to California consumers.

This is one vital piece of information that policy and other decisionmakers will have to take into consideration when determining the fate of MTBE and possible other alternative oxygenates.

As Commissioner Sharpless also mentioned, we expect to have an individual, Dan Chang, who is Chair of Civil and Environmental Engineering at U.C. Davis, speak briefly about their study which was released yesterday concerning health impacts, water treatment, cost, et cetera.

And those are some of the other broader issues that will be examined by policymakers, once again, in deciding what will happen with MTBE.

That concludes my remarks. And if there are any questions?

PRESIDING COMMISSIONER SHARPLESS: Well, I think that the consultants are going to go into a little bit more depth. So why don't we go on to the consultants and allow all the information to be put out before we get into other people's comments and concerns.

MR. SCHREMP: Very good.

PRESIDING COMMISSIONER SHARPLESS: Thank you, Mr. Schremp.

MR. SCHREMP: And I'd like to introduce Aaron Brady with Energy Security Analysis Incorporated. And his work involved, once again, determining supply cost curves for alternative oxygenates.

Aaron.

MR. BRADY: Thanks, Gordon.

My name is Aaron Brady, and I work for Energy Security Analysis. And we were hired by the Energy Commission to look at some of the alternate oxygenates that are out there in the marketplace that could possibly replace MTBE and then estimate what it would cost to import those oxygenates to California.

As Gordon mentioned, the oxygenates we looked at were ethanol, ETBE, TAME and TBA.

We also prepared a short explanation of some of the tax incentives for ethanol just to sort of clear up any misunderstandings that might still exist on that account. And that's included as an appendix in the report.

But basically our main task was to prepare upward sloping cost curves for the different oxygenates.

My presentation is just going to be to basically go over some of the methodologies we used and some of the results of the cost curves. I'm not going to go over each cost curve, because there were lots of them. But I will mention just the most important ones, basically the ethanol ones. And I'll briefly mention some of the other ones. But I think everyone's mostly interested in the ethanol cases. So I'll spend the most time on that.

Our first task was really to just find out what was out there. And what we did was looked around the world and tried to determine exactly how much capacity is out there for producing some of these different oxygenates. And when possible we did a plant-by-plant assessment of each oxygenate capacity.

This is sort of the result of what's out there. As you can see, most of the oxygenates are fairly limited in capacity at present time. The U.S. ethanol industry -- actually that's more of a North American. It's mostly U.S., but a little bit of Canadian ethanol, too. It's about 111,000 barrels a day of capacity. Globally there's probably more like 374. That's basically including North America and Brazil.

Brazil is the other big producer. We didn't really include Brazil as part of the import possibilities because most of that ethanol in Brazil is sort of captive. It can't be exported out of the country because of certain mandates that Brazil has. And, for example, they have to include 24 percent of ethanol into all their gasoline. And there are cars in Brazil that require 100-percent ethanol. So most of that ethanol can't really be exported out of the country.

Also there is a 54-cent-per-gallon tariff that would be assessed on any Brazilian ethanol that would be imported into the United States.

ETBE, there's about 53,000 barrels a day of MTBE/ETBE dual capacity in the United States and 91,000 barrels a day globally. TAME, even less; 23,000 barrels a day in the U.S. and 47,000 barrels a day globally. TBA is also limited at approximately 35,000 barrels a day. Most of that's in the Gulf Coast. And 60,000 barrels a day world wide.

In the intermediate term, however, we did assume that you could increase ETBE capacity and TBA capacity by converting MTBE plants to either ETBE or TBA production. So that was one of the assumptions in the intermediate term.

PRESIDING COMMISSIONER SHARPLESS: Mr. Brady, could I ask you a question --

MR. BRADY: Yes, sure.

PRESIDING COMMISSIONER SHARPLESS: -- about whether or not these facilities are facilities that exist and how you dealt with facilities that may be on the drawing boards? Have you included those that are being planned to be built into your numbers, or how did you deal with the speculative part of this equation?

MR. BRADY: Well, there really aren't that many ETBE plants or TBA plants, really not even that many TAME plants being planned, as far as I know. There are some ethanol plant being prepared, but the timing and when they'd come on line is really -- you know, you get a range of answers as to when they'll be on line. So the answer is I used the present capacity, and that is it right now.

But we did allow for some increase through debottlenecking and, you know, in the example of the ethanol plants redirecting starch flows and things that they can do to increase capacity in the intermediate term. But we didn't allow for -- the intermediate term definition was no new grass roots plants. So I was going along with that assumption.

PRESIDING COMMISSIONER SHARPLESS: And did that also apply to the long term? It didn't, did it?

MR. BRADY: In the long term, the long term allows for additions to new capacity, new plants.

PRESIDING COMMISSIONER SHARPLESS: So that would be assuming if there were a market demand facilities would be built?

MR. BRADY: That's right.

PRESIDING COMMISSIONER SHARPLESS: Okay.

MR. BRADY: So I'll turn to the ethanol intermediate-term case first. Basically the idea is that since no new ethanol plants can be built, the problem is that you have to get the ethanol that is currently being used in the United States to California somehow. Most of that's in the Midwest.

So in the intermediate term the ethanol that's currently being used in the Midwest somehow has to be bid away from current users and brought to California.

The methodology to do that is basically to first identify where are the different blocks of ethanol that exist in a country, and then determine some sort of break-even price above which present users of ethanol would give up that supply and it could be transported to California. So this is basically the idea that California blenders could bid away that ethanol that's being used in the Midwest and transport it, with the transportation costs, to California. So that's the basic idea of what we did.

Getting a little bit more to specifics, first you have to ask the ethanol that's being used out there in the country, how is it valued? Is it valued as an oxygenate, or is it valued as simply a gasoline extender, commonly know as gasohol?

And what we did is we used two identities basically, two sort of algebraic identities, which I won't go into too much detail. It's all derived in the report. But basically what those identities are saying is for the one where you value ethanol as an oxygenate, it's

simply stating that one gallon of oxygenated gasoline made of a percentage blend of ARBOB used for MTBE and a percentage blend of MTBE is equal to one gallon of oxygenated gasoline made of a percentage blend of ARBOB for ethanol blending plus --

PRESIDING COMMISSIONER SHARPLESS: ARBOB, for people who don't know the nomenclature, is what?

MR. BRADY: Is the reformulated blend stock for oxygenating and blending. It's basically the gasoline base before you add the oxygenate.

PRESIDING COMMISSIONER SHARPLESS: Thank you.

MR. BRADY: So using those identities you can solve for the price of ethanol and figure out its value that way. In the case of ethanol used for gasohol it's a little bit different. But it's another identity which basically says that the pump price of pool gasoline minus the rack price of pool gasoline should be equal to the pump price of gasohol minus the price of the ARBOB, minus the price of the ethanol. And so you solve again there for the price of ethanol.

The next step is then to identify the blocks of supply, now that we have a way of valuing that ethanol. What I did was I used data from the U.S. Federal Highway Administration, which estimates ethanol use by state. And then this gives me a rough idea of the blocks of ethanol that would then need to be bid away.

And then once we have the individual blocks or volumes of supply that we can use for the price curve, you just apply the break-even formulas I've just discussed.

Now those break-even formulas will yield different values for ethanol because gasoline is priced differently in each state. So what I did was I used state-by-state gasoline prices to plug into the formulas that I just showed you which gave you different ethanol values for each state. So that gives you a price and an analogous volume to match up the greatest supply curve.

So each one of those blocks of supply is sort of equal to the amount of ethanol used by a state. The assumption here was that the transportation cost would be 15 cents per gallon. That would be ethanol that would be railed in from the Midwest, the ethanol-producing plants, to California.

And the price as shown on the graph here is net of the 54-cent subsidy. So, in other words, blenders would pay the market price and take out the 54-cent-per-gallon tax credit.

So the result is that if California required roughly 50,000 barrels a day of ethanol, that's roughly the amount of ethanol that would be needed to replace MTBE on a two-percent oxygen basis, then the delivered price to California would be $1.45 a gallon. And if you net out the 54-cent-a-gallon subsidy, it becomes about 91 cents per gallon. And that's again at 50,000 barrels a day.

Moving on up to 97,000 barrels a day which I think is roughly the amount needed to replace MTBE on a 3.5-percent oxygen basis, the price becomes $1.61. Net of the subsidy, it's $1.07.

Just a couple other notes on this intermediate-term case. Again, as I mentioned before, we did not consider imports of Brazilian ethanol, due mostly to the tariff barrier, which would make it inordinately expensive and the fact that they really don't have a lot to export in the intermediate term.

There is some ethanol that can be imported into the U.S. duty free. This is known as Caribbean Basin ethanol. It's basically ethanol that, as I understand it, comes from the European Union states. It's sort of unfinished ethanol that's shipped to the countries like Jamaica and El Salvador where they finish it and ship it into the United States duty free. The law allows for seven percent of U.S. production. So 8,000 barrels a day is roughly seven percent of 110,000 barrels a day.

We also allowed for an increase in ethanol production in the United States from the current underutilized capacity. So there is about -- using the figures that I used -- there's about 30,000 barrels a day of unused ethanol capacity. This is using 1997 data. I should make that clear, because I think it's gone up a bit this year. So that ethanol can also be put into the supply curve.

The long-term case is a bit different. As I mentioned before, in the long-term new ethanol plants will be built. And we assumed that enough new plants are built to meet the additional demands of California. And we also assumed that this market will operate in a very competitive fashion much like the refining industry. Because of this the price of ethanol will drop to roughly production costs.

However, those production costs will be upward sloping because as you require more, produce more ethanol, you're going to require more demand of the corn feedstocks which should drive up the price in the long term. Also, as you produce more ethanol, you're going to be creating more supply of the ethanol

co-products, such as the distilled grains, the gluten feed and gluten meal and some of the other various co-products that are produced along with ethanol production. As you produce more of those and put more of those on to the market that should drive the price of those down.

Now an ethanol producer's cost is basically the price they receive for -- well, the production cost is basically a sort of set cost plus the corn feedstock cost. I mean the corn feedstock cost is the majority of their cost. So as you raise the cost of corn, that's going to drive up their production costs. But their net production costs you have to consider also what they receive for the price of ethanol and what they receive for their co-product prices.

And if those co-product prices decline, the result is that your net production costs are going to increase. So we did look at that and estimated what the increase would be in the price of corn over certain volumes, additional volumes, of ethanol and what the

decrease in the price of the co-products would be over the span of the different volumes of ethanol that would be demanded.

So basically if ethanol demand in California, above current demand, was 50,000 barrels a day, we figured what that would equal in terms of bushels of corn using the appropriate conversion factors and also what that would mean in terms of supply of co-products in terms of tons or however it's measured.

And we used a sort of long-term elasticity values to determine the long-term price effects on corn and the co-products.

So the result is generally an upward-sloping production cost curve for ethanol. And again I'm assuming a 15-cent-per-gallon transportation cost from the Midwest, where I'm assuming most of the ethanol will still be produced, 15 cents per gallon transportation cost to California. And again here the price is net of the 54-cent-per-gallon subsidy.

PRESIDING COMMISSIONER SHARPLESS: And again the transportation is rail?

MR. BRADY: Exactly, right.

PRESIDING COMMISSIONER SHARPLESS: Okay.

MR. BRADY: That's the assumption.

So the results are basically in the long term at 50,000 barrels a day -- I might be a little bit low here in terms of replacing MTBE on the two-percent oxygen basis -- but at 50,000 barrels a day the price would be approximately $1.22 a gallon. And net of the subsidy, that's about 68 cents per gallon. Moving up the supply curve, once you get to 97,000 barrels a day, the price rises a couple cents to $1.24 a gallon, or 70 cents per gallon net of the subsidy.

The CEC also asked us to look at a couple other scenarios for ethanol, including what would happen if the tax incentive was removed. And basically what we assumed was that without the subsidy ethanol production in the U.S. would decline to zero.

So to estimate a supply curve function in that case, basically the methodology is what would the price have to go up to to bring that production that had to go out of business back into business? What does the priced have to rise to to make that happen? And basically the price would have to rise to at least production costs, or else they wouldn't make it.

The production cost, as I explained in the previous case, is going out depend on basically the feedstock cost. So what we did is we went and looked at the states that do produce ethanol and what the corn costs are in those states because they do vary.

So you have an upward-sloping supply curve that results -- which is basically bringing back ethanol production in the United States block by block by production cost. And I would just mention that this is a notional production cost. It's impossible to get data on every single ethanol plant in the United States.

So I think this is the best you can do is sort of to provide a rough estimate based on notional costs. But the most germane segment of the production cost is the cost of corn.

I'll spend a little bit less time on some of the other oxygenates. But the next major one that we looked at was ETBE. And the important thing here is that for ETBE the price is very dependent on obviously the cost of ethanol since a gallon of ETBE is manufactured by using approximately 43-percent ethanol. So the price of ethanol will definitely impact the price of ETBE.

So the methodology for building the supply curve for ETBE is fairly straightforward. We used a basic production cost formula for ETBE and substituted in the price of ethanol. And we got the input of the price of ethanol from the ethanol price curves that I showed you before. So basically this supply curve is reading off the ethanol supply curve using a standard production cost formula.

And also, like I said before, the intermediate term does allow for the conversion of MTBE plants to ETBE. So that 53,000 barrels a day that exists in the United States would

go up, that capacity would go up, because the intermediate term MTBE plants would be converted.

The results are at approximately 123,000 barrels a day, which is again the amount that would be needed to replace MTBE on a two-percent oxygen basis, the cost would be about $1.28. If you subtract out the prorated subsidy, that's what the lower cost curve there is, this would equal about $1.05 per gallon.

If you move up the supply curve to 165,000 barrels a day of ETBE, or the amount that would be needed to replace oxygen on a 3.5-percent basis, the cost would be approximately $1.31. And minus the prorated subsidy, this would equal about $1.08.

We also looked at the cost to provide TAME. The limiting factor here is that there is very little TAME capacity. Most of it, in fact I think all of it, is located within refinery gates. It's not produced for merchant sales. It's produced to be used within refineries. So again the idea, just like in ethanol, is that you would have somehow bid away, this TAME supply, away from the refineries that use it.

So you have to value TAME correctly. And this was done pretty much the same way as ethanol where break-even calculations were performed and supply blocks were identified wherever they were around the country or, indeed, overseas. And the transportation cost was assessed from the various different regions.

Gordon was beginning to touch on this. But we did assess TAME an extra ten cents a gallon for transportation and handling costs because it's produced on such a small scale that we believe the transportation and handling costs would be a lot higher. Without it, it would seem to make sense to import TAME into California which is not presently done.

The last oxygenate we looked at was TBA. Again TBA production is extremely limited in the United States and around the world. But we did allow an intermediate term for conversion of MTBE plants to TBA production. The idea here was pretty much the same as TAME. Break-even calculations were calculated for TBA.

Basically there could be two cases. There's the TBA plants that currently produce it. It's currently produced as an intermediary feedstock for MTBE production. So the break-even calculation would be to determine what it would take to bid away that, you know, make it more valuable for the TBA producers to produce TBA as a finished product instead of using it as an intermediary for MTBE production. So a break-even calculation was used for that.

The other break-even calculation would be to bid away the TBA production that would be converted from MTBE capacity. And these are the results of the supply cost curve for TBA.

MR. SCHREMP: That's the end of the presentation.

PRESIDING COMMISSIONER SHARPLESS: I don't know quite how to ask this question. But it's a question that goes to a certain level of uncertainties in all of the information that we're dealing with here.

When you talk about, for instance, production of corn in the Midwest, how you factor in risk, such as weather, and other possibilities? How did you deal with the issue of risk in your analysis?

MR. BRADY: In terms of corn production?

PRESIDING COMMISSIONER SHARPLESS: Well, since we're looking at the supply curves it would be -- yes, if you want to focus on corn production, that would be one. But it would apply to the other alternatives, as well, I would assume?

MR. BRADY: I guess I don't totally understand. I mean, there's different types of risks you're taking about. You know, all-encompassing like regulatory aspects of risk for uncertainty.

PRESIDING COMMISSIONER SHARPLESS: Well, there are a number of risks that go into any analysis. And you deal with factoring what the probability of those

risks are into cost is really the question I'm asking you. How did you deal with the probability of risk in your cost curves? Is it still too unclear?

MR. BRADY: It's not really something I think you can model. I mean that's basically the answer. In the immediate term I think we talked about a lot of the risks that are involved. If you were to try and bid away ethanol from the current users -- and that's in the report, and we wrote some stuff for the CEC. It's included in the immediate-term description of what would happen.

But in the intermediate term the assumption is that prices level off to some equilibrium level after three years, after all the gyrations of the market have settled down.

So I guess the bottom line is there's no -- you know, any price that we added to the cost of ethanol, or any of the other oxygenates in terms of cents per gallon would just be sort of an opinion. There's no real way to model it. But you can talk to descriptively about it and qualitatively about it in the immediate term.

PRESIDING COMMISSIONER SHARPLESS: Commissioner Moore?

COMMISSIONER MOORE: Yes. I have just a couple of questions. You have an ethanol supply curve long term. And I'm wondering two things about it: One, does it flatten out at some point in time? In other words, do you have a demand characteristic that at some point causes it to flatten out?

MR. BRADY: No. As you demand more and more corn for ethanol production, the price of corn keeps going up.

COMMISSIONER MOORE: So you have a rising supply curve?

MR. BRADY: Well, I mean it's not steeply rising. It only goes up a few cents. But the idea is that enough corn production does come on line to supply the market. But this will respond to long-term elasticities of supply.

COMMISSIONER MOORE: And what was elasticity coefficient that you assumed?

MR. BRADY: We used one that the U.S. Department of Agriculture supplied for us at .3.

COMMISSIONER MOORE: .3, okay.

MR. BRADY: And then we calculate our own for the co-products based on some other reports that the USDA...

COMMISSIONER MOORE: How widely did those vary for the co-products? What was the range?

MR. BRADY: I'd have to look, but I think distiller dry grains would decrease by something like seven percent if you increased ethanol production by a very large amount. I think it was 4.8 billion gallons per year over seven years. I mean not just over a year. So that's basically equivalent to our long term. They're in the appendix of the report. I'd have to look at them. I don't know what they are offhand.

COMMISSIONER MOORE: So there's no other factor that changes that elasticity coefficient? In other words, no other external feature that you could get that boosts that?

MR. BRADY: No.

COMMISSIONER MOORE: Thanks.

PRESIDING COMMISSIONER SHARPLESS: I think the next person is John Vautrain.

MR. VAUTRAIN: Good morning. My name is John Vautrain. I'm Vice President of Purvin and Gertz, Inc. We're an energy consulting firm dealing mostly in energy economics issues. Our consultants are all chemical engineers. So we tend to review problems from a technical point of view.

Our contribution to this effort has been mostly in the area of identifying availability and costs of CARBOB from sources outside California and the adequacy of the marine infrastructure needed to deliver those supplies to the state. And I guess we ought to

define CARBOB. That's an analogue of ARBOB only for California reformulated gasoline purposes.

This slide shows that there are 726 refineries outside California, and I'll show in a minute where those are, with a total capacity of around 76 million barrels per day. Those refineries produce around 17 million barrels per day of gasoline.

Thus far only four of these manufacture CARB gasoline for delivery to California. One of those is in the Pacific Northwest, one on the Gulf Coast, one in the Caribbean and one in Europe.

We know that many more refineries could produce CARB gasoline if the proper price incentives were in place. The fact that they haven't done is partially a reflection of inadequate demand. That is, California refiners are able to meet just about all the demand there is. And it's also partially a price issue.

Distant refiners have not seen an adequate price incentive, on a sustained basis, to induce them to produce CARB gasoline. The whole point of this part of the study was to figure out how many of those 726 refineries could produce CARB gasoline, how much they could make, and what sort of price incentives would have to exist.

This map shows the regions of the world that we considered. The areas shown in gray were excluded from the study mostly because of logistical constraints that would prevent fuels that are manufactured in those areas from ever being delivered to California.

In our work we considered each of these colored areas separately. The reason we did that is that the cost to access fuels depends on the prevailing prices in the supplying regions and their transportation costs. I'll get into more of that later. The colored areas divide the world into regions that are fairly consistent in their cost structures.

The ability to produce CARB gasoline is dependent on types of refinery equipment that a refinery has. We considered the experience of CARB producers in

California as well as technical aspects of refining to identify four key processes that most commonly associated with being able to produce CARB gasoline.

We wanted to limit our consideration of all these 726 refiners to those that would have a reasonable prospect of making CARBOB at cargo quantities. If refiners' rates are too low, it would be an impractical supplier to California.

It is somewhat easier for distant refiners than for California refiners to make CARB gasoline because they can select only the best blend stocks for CARB and sell the rest of the material into other markets, either domestically or other export markets. We did not assume that these refiners would invest appreciably to make CARB gasoline.

We used these concepts to develop a screening tool to identify --

PRESIDING COMMISSIONER SHARPLESS: Now are you talking in both scenarios for both the intermediate and the long term when you made that last statement?

MR. VAUTRAIN: That they would not invest; that's correct. I consider that unlikely that they would do so. And what's more, as it turns out, even without investing, out of 17 million barrels a day of gasoline, you can collect enough high-quality components that you don't really need to invest.

We used these concepts to build a screening tool to identify refiners likely to be able to produce CARB gasoline and separate those from the less likely refiners.

I should note that these screening tools are -- there are some imperfection involved. Many of the refiners we identified are unlikely ever to make CARB gasoline. And there's other refiners that we've identified as unable to make CARB still could make some useful blend stocks or perhaps a small amount.

The screening tool, however, is appropriate for purposes of identifying the range of availability and that's what we were trying to do.

This chart shows the split of CARB capable and incapable refining capacity in each region. As you note, on the Gulf Coast, most of the refining capacity is in refineries

that are actually able to produce CARB gasoline. And they could make CARB if they chose to do so. Not necessarily 100 percent of their production. In fact, it would be a some fraction, but at least some.

Conversely, in Europe and the Far East, most refiners just don't have the right kind of equipment to make CARB at all. And the other regions that we've identified don't have a lot of refining capacity that's suitable for manufacturing CARB gasoline.

Alkylate is the key component to manufacturing CARB gasoline in our view. While it's technically possible to produce CARB gasoline without Alkylate, having Alkylate as a blend stock is very important. Alkylate has very good characteristics for manufacturing CARB gasoline. It has none of the objectionable characteristics of olefin sulfur, aromatics benzene, or vapor pressure, and it has an appropriate boiling range.

Every other refinery blend stock has at least some negative associated with it. For example, too much aromatics has to be blended off, too much sulfur, or unavoidably high vapor pressure. So we keyed our CARB production capability to Alkylate production and the availability of that material.

This slide shows the world supply of Alkylate outside of California. There are about 740,000 barrels per day of Alkylate produced, mostly in the U.S. Gulf Coast. Making Alkylate requires cat-cracking, which is very common on the Gulf Coast but less common elsewhere. And it also requires plentiful and cheap LPG, really isobutane. That's also common on the Gulf Coast, but not so common elsewhere.

We have also estimated on this slide how much of the Alkylate that is made could be made available to produce CARB gasoline. This fraction carries some uncertainty since it's a function of price. If a refiner is offered a price that's high enough, he would release quite a bit of the Alkylate. But we tried to estimate the quantity that could be released without significant disruption of the underlying price structure.

The Alkylate supply was translated into volume of CARBOB by using CARBOB Alkylate ratios. We could not optimize these ratios for each refinery because we were dealing with so many different refineries. We considered the predictive model and reviewed its output. But we did not use it quantitatively to determine the ratios used.

Instead, we just defined three categories of cases into which we could classify all the different alternatives we had to look at. And we believe that these categories fairly represent the flexibility of refiners to produce CARB for an Alkylate.

This slide shows the supply cost build-up for CARBOB in each region. Now we started off with a base gasoline price. And this varies from region to region, as you see. And then we added in processing costs and these other components of cost, as well as a refiner margin to induce the refiners to produce CARBOB for the California market. We included the transportation to California as part of the calculation. The bar across the plot shows the actual CARB gasoline cost in California at the wholesale level in the base period in the summer of 1997.

I've provided here a supply curve just for one of the cases. We did this actually for many cases. But this shows the volume of gasoline that could come from each source and the cost at which it could be supplied to California, including transportation.

So what we see is that Europe would be the least expensive supplier, which sounds a little odd, but that's because of transportation costs from Europe are lower than from the Gulf Coast because they can use International Flag Carriers. And all the way up the Gulf Coast is the largest possible supplier, but has relatively high cost because of the transportation cost using Jones Act tankers.

The Pacific Northwest, Middle East and Far East are relatively expensive, mostly because the underlying cost of gasoline is high.

Now we also looked a marine infrastructure, as Gordon noted. The MTBE ban could generate both inbound and outbound trade. Inbound we could have CARBOB as well

as blend stocks and other components, such as oxygenates. Outbound we could have nonconforming gasoline components or blend stocks and possibly even other types of products manufactured by refineries in an attempt to make CARB gasoline for California.

We looked at two different types of assets that are used for this transportation. One, of course, is ports and terminal facilities. That is the on-shore facilities are needed to load ships or unload ships. And secondly were the tankers themselves.

The port and terminal assets include both refinery and third-party marine terminals. There's quite an industry in California of third-party terminals that supplement the abilities of the refineries.

And in the report we discuss how these facilities differ in their capabilities. We found that the terminals for conventional products are adequate. That is, for shipping in and out gasoline or other types of materials there are adequate port facilities in California.

However, for pentane or other high vapor pressure components like butane, there is a shortfall of capability. So that for these products, marine shipment really isn't much of an option at this point.

On the tanker side, the Jones Act tankers are a problem. The Jones Act tankers are required for domestic shipments. That is from the U.S. Gulf Coast, we would need Jones Act tankers. Jones Act tankers have to be not only U.S. flagged, but also built in U.S. shipyards. And there are other requirements. There are only about 90 of these tankers at this point. The fleet is old, and it's getting smaller all the time as retirements occur.

We believe in order to have a sustained volume of shipments at high levels from the Gulf Coast we would have to build new Jones Act tankers. And that requires quite a bit of time.

We did find that the costs, the typical costs we were using for shipments, which is about eight to ten cents per gallon, would be adequate to support those tankers if they were used continuously on a long-term basis to provide fuel to California.

PRESIDING COMMISSIONER SHARPLESS: "Those tankers," referring to what?

MR. VAUTRAIN: Jones Act.

PRESIDING COMMISSIONER SHARPLESS: So the new ones?

MR. VAUTRAIN: A new Jones Act tanker would be more costly than an existing one. Obviously you have to build it. It would be a fixed cost. But this would only be done if there was an assurance that tanker could be used for a long period of time.

PRESIDING COMMISSIONER SHARPLESS: I was trying to get you to respond to the eight and ten cents refers to the use of existing Jones tankers?

MR. VAUTRAIN: Yes. That number is a typical number for current shipping costs. And we were concerned that perhaps that cost would go up if we required new tankers. And we found that would not be the case, provided that those new tankers could be committed on a long-term basis to full utilization moving products back and forth to California.

PRESIDING COMMISSIONER SHARPLESS: Thank you.

MR. VAUTRAIN: And the International Flag Tanker Fleet is much much larger. And this could be used to ship from all the other world sources. And there are enough of those to not worry about the tankers internationally.

That concludes all the prepared remarks I have.

PRESIDING COMMISSIONER SHARPLESS: I don't believe we have any questions, and I'd like to move along.

So perhaps we can go to Dave Hirshfeld of MathPro.

MR. HIRSHFELD: Okay, if we could have the first slide, please? Oh, well, I guess if you have good eyes you could see that.

At any rate, our portion of the analysis was to, as Gordon has said, to analyze the operations of the California refining sector, in particular, and through that analysis estimate

the economics and the technical consequences of producing CARB gasoline without the use of MTBE in both the intermediate and the long term.

And in order to accomplish that we were to use and establish a linear programming modeling system that addresses refinery operations, and that we did.

I suppose this is probably old hat for the Commissioners and for most of the people in the room. But perhaps for some people it's not. Linear programming is a particular form of mathematical modeling that I guess some people consider pretty arcane or maybe haven't even heard of.

But it has been the method of choice for analyzing refining economics for decades, both in the private sector and in the public sector. And the nature of it as applied to refineries is that it's driven by economic considerations.

That's what makes such models find solutions. It deals in explicit technical detail and it's process-oriented. It's not an econometric approach. Our particular refinery modeling system has been applied in a number of public policy studies in recent years. And in a number of those it's been subjected to peer review, some friendly, some not friendly, some mixtures of it. So it's veteran.

The work plan for our part of the task involved first laying out the various assumptions and the scenarios that were to be considered. This was mainly a matter for the record. And that report was issued in December.

Then we, as our second task, we undertook, as we customarily do, a calibration of the modeling system whose intent was to demonstrate the model's ability to represent the current business-as-usual operations of the California refining system to serve as a springboard for analyzing the future possibilities. And I'll talk about that. That report was issued in June.

And then third was to analyze the various combinations of policies projected, such as HR 630 being on or not on, in combination with alternative oxygenates. And we

showed results in our Task 3 report for something on the order of 50 different combinations. So we covered quite a bit of ground.

Now in all of that, the calibration work and the policy cases were reflective of various assumptions or premises, and way too many to lay out in detail here. But some of the important ones I think are worth taking some time to talk about.

We used projected demand for refined products in the periods of 2002, 2005, both aggregate volumes and grade splits that were provided to us by CEC for California. We used prices of inputs to the refinery, natural gas, crude oil, that were from Department of Energy publications.

The crude oil slate, which is to say the mix of crude oils that are processed by California refiners, we took to be essentially unchanged from 1997 operation. In other words, we said that changing that makes a crude oil would not be a likely consequence of different methods of gasoline manufacture here. And then we held constant all product specifications and emission standards on refined products, except as we had to consider changes in the various policy cases.

We assumed that product demands would not be subject to any price elasticities, that these demands would be constant over the range of prices, that are cost changes actually, that we would be analyzing.

We further assumed that the tax credits structure for ethanol blending would remain in place and would be available to blenders at the current statutory oxygen contents that you see there, 2.1, 2.7 and 3.5.

In addition, we assumed that the refining sector's response to a ban on the use of MTBE would involve a combination of advanced processing techniques that might or might not be practiced today in the California sector and investment in the long term in commercially available process technology.

Now what I'm saying there is, in my view, fairly important that we are trying to capture a situation in which the refining industry would respond to this change in its environment by practicing good engineering, and good practice, best practice, which would be feasible to do but might not necessarily represent things that they're doing now, for example, changing catalysts in a FCC unit, things of that sort. And that they would make investments in the best -- I use "best" in its overall sense for this project -- available technology.

In other words, we try to capture in this technology, process technology. That is, on the one hand, at the forefront but, on the other hand, demonstrably as commercially available now.

So we do not make assumptions about what might be available in five or six years. But at the same time we assumed that refiners would not invest in obsolete technology.

And then we also assumed there would be no refinery investment in the intermediate term. That's by definition. And that investments would be possible in the longer term.

Okay, could I have the next slide?

PRESIDING COMMISSIONER SHARPLESS: So that is --

MR. HIRSHFELD: Yes.

PRESIDING COMMISSIONER SHARPLESS: -- to say something different that Mr. Schremp's earlier comment when he was talking about the connection of the intermediate cost being perhaps slight refinery modifications is different than the investments that you're talking about?

MR. HIRSHFELD: Yes. Let me speak to that point a little more. It's a good question. In fact, we had a layout in our analysis at intermediate term for some investment to

be made and some capacity expansion in an effort to capture the phenomenon of capacity creep that goes on.

What we wanted was to be representing a situation in the intermediate term, which involves some growth in demand. We're looking at 2002. There would be essentially the same amount of slack capacity available to refiners, as there was in 1997 at a lower level of demand, by virtue of this capacity creep, so that we would not be including in a reported economics any component of cost increase that came about because the refineries were tight going into the new regulation. Okay?

So we tried to bring the refineries forward to 2002 at the same level of capacity utilization that they had in 1997. And in some cases -- and this is spelled out in considerable detail in our Task 3 Report -- we allowed for some small increments of small investments in some process units. But the objective was not to accommodate new regulations. It was to accommodate capacity creep.

PRESIDING COMMISSIONER SHARPLESS: Thank you.

MR. HIRSHFELD: Okay. So let's see, we got the calibration one, good.

All right. The calibration phase of our activity probably took more calendar time than actually analyzing the various policy alternatives themselves. It's a rather complicated process. And, you know, this is not the place to go into in detail, but the general idea was we picked a period in a recent past. And the most recent we could analyze was the summer of 1997.

And we asked our refinery modeling system to simulate the performance of the California refining sector, for pretty much on a volumetric basis, to demonstrate its representational ability. And the idea was that we offered the refinery model representations of all the inputs to the refineries, crude oil, unfinished oils, and so on, in known volumes. And then asked the model to deliver a slate of outputs -- product volumes, product qualities,

capacity utilizations were very important -- that we could look back and compare to 1997 and say it matches.

And in order to do that, as in the case in a restudy, we have to do some adjustment and fine-tuning of technical coefficients of which there's about 40,000 in the model. And it isn't just arbitrary. You just don't tinker with coefficients just because. It's purposeful.

You're looking at things like blend stock property, FCC gasoline properties, reformulate properties that are unique to the California refineries because of their technical characteristics. And you try to achieve those matches.

And you know you've achieved success when you've got an output slate that stacks up against what was measured or reported in 1997. So, for example, we ended up estimating a sulfur content of the aggregate California gasoline pool that was about 2 ppm different than what was reported. And it was that kind of match-up that we were looking for.

So again the calibration was in terms of volumes and specifications, products and capacity utilization. So with that as a foundation we then went and looked at these various combinations of policies and oxygenates.

Now this is simple little diagram that illustrates some fairly special aspects of this analysis. We did things a little bit differently in this project than is customary. We took the analysis a little bit further.

Basically the little box in the middle is just symbolically representing our refinery modeling system. And what I want to indicate there is that it incorporates both standard representation calibrated of refinery operations for the aggregate California refinery and a built-in representation of the predictive model, both averaging and flat modes.

So that when we look at the outputs of the model we're looking at gasoline qualities in particular that are in compliance with the predictive model. And we routinely check those results and verify them against the official version of predictive model, just to

make doubly sure, before we report any results. So what's happening is an optimization that's simultaneously applying the refinery representation and the predictive model.

In addition, what we accept into the model are the various forecasts of prices and demands which I've mentioned earlier in the assumptions and the supply functions that came to us from ESAI and Purvin and Gertz. They actually become direct inputs into the model. So it's not just a refinery model now, but kind of a balancing model as well.

We also accept into, as input into the model, what we chose to call disposal functions which represented volume-price relationships for excess materials, materials that refiners would not be able to efficiently use and would be exported in some of these new regimes. So they also come in, as well as emissions' targets, which represent small projected give-aways or exceedences in emissions reductions that represent refining operations on the whole.

Then the outputs are, as you see there, capacity utilizations in each of these scenarios; investment requirements where capacity expansions are called for; refining costs, just the incremental out-of-pocket cost for operating the refinery; all the various product volumes turned out by refinery: gasoline, diesel fuel, other distillate products, heavy products; and the properties and composition of all the gasolines produced in California, not only CARB, but also exported reformulated and conventional gasoline. So we're to satisfy all those requirements. And then demonstrating that the CARB gasoline satisfies predictive model requirements and any exported federal RFG meets complex model requirements. So all of that is what's flowing out of this.

The only thing I need to talk about here is just the third bullet at the bottom. And that is given that array of inputs, which are the usual refining inputs, and the supply functions and disposal functions, we asked the refinery model to compute the least-cost solution, which is the optimal use of imports, exports and in-state refining capacity to

produce or to deliver to California consumers a fixed product slate. So we're looking for the least-cost use of in-state capacity, purchases, disposals.

Could I go to the next? I think I've covered all of this, as well. So we can move on to the next one.

The last item was on the preceding slide was their reported average cost. And this is something I think is appropriate to talk about a little bit more.

When we report out of an analysis like this an average cost for a particular scenario, it is the sum of five components. One is the variable operating cost, the direct cents per barrel or cents per gallon, operating cost that is computed for the particular scenario. That's item number one.

Secondly is a capital charge which represents a return on capital investment expressed in terms of cents per gallon.

Third is a category we call ancillary refining cost. And it represents a category of cost that refiners do incur, would incur in operations, but that one cannot directly capture in an LP model by the nature of things. There's such things as change incidence in off-spent blends, additional tankage that might be required, changes in the safety margins in measuring blend stock properties, changes in the give-aways if that's appropriate, in emissions quality, and so on.

These are all costs that would come into play, but they just don't model in an LP model, but yet they deserve consideration.

Next is a item that we christen logistics cost. And this applied to the ethanol. And it should also apply to, we understand, the TBA options. And this involves incremental costs associated with completing the blending of finished gasoline at terminals and delivering the oxygenate to each and every terminal, and then delivering CARBOB, and bringing them together at the terminals. And there's a small incremental cost for that, as opposed to refinery blending.

And then lastly, as appropriate, we computed a change in fuel economy, which is not directly a refining cost, but it's a social cost. And so we include that.

So all of the costs that come under discussion are the sum of those items. And that is shown I think in our report.

We did a few sensitivity analyses along the way, even though they weren't necessarily in the scope of work. But a couple of issues just sort of jumped off the page at us and led us to explore them during the course of the study. One was the supply function for Alkylate.

And during the course of the reviews that went on, some question was raised about the output supply function and what the impact of it would be on our cost. And so we posited some changes in it, making less Alkylate available at given prices, or more Alkylate available. And sensitivity to that, of course, showed just what you think it would show, that less Alkylates available at a given price, the higher the cost, and so on. But we were able to quantify that and explore the issue.

A second one that we delved into was different ways of applying the predictive model. We did the calibration using the predictive model in its averaging mode. The calibration was producing an average California gasoline pool for 1997. It seemed reasonable to measure its performance against the predictive model in averaging.

As the study came on, it came to one's attention that actually in reality most of the gasoline that is produced, most of the CARB gasoline, is certified using the flat limits mode of predictive model. And the intent of the flat limits variant of the predictive model is to offer refiners additional flexibility, as you well know, which in turn is intended to provide opportunities for producing compliant gasoline at the cost. And that was the basis for the interest.

So we essentially mapped all the runs that we had done into another set, in which we used flat limit, their verse in predictive model, which leads to -- when you're trying

to represent flat limits operations using an aggregate refinery that's delivering average properties, you get into a really arcane and for us very interesting area of analysis. I mean we had a heck of a time with it.

And we've received some comments back from some of our counterparts in the refining industry. And there's, I would say, some continuing intellectual interest in this. It's a very, very specialized and interesting analytical issue. Obviously, when you do apply the flat limits, you come up with somewhat lower cost alternative by alternative. And that shows up in our report. All of our numbers reflect this.

So let's go on to the next slide. I'm not showing any of our quantitative results in my presentation just because there's so many of them. Those of you who have had a chance to look at our Task 3 Report, without straining your back picking it up, will see that there's no shortage of numbers in it. And I really couldn't do justice to any of them, that volume of numbers here. So I'm not showing them as John and Aaron did in their cases. So I want to just finish up with some concluding perspective-type comments.

I said several times, and I'll say it again, the refining analysis we were asked to do deals with aggregate refining capacity in the state modeled as an aggregate refinery. In other words, what we modeled was as though something on the order of two million barrels a day of refining capacity, crude running capacity, existed in one supercolossal refinery.

This, of course, is not physically the case. And, as a result, aggregate refinery representations tend to, in any study -- and whether it be this one or anything else -- tend to have a bias towards understating the cost of operation to meet any set of standards or product specifications

And the reason for that is that the aggregate model, by its very nature, is assuming that every refinery, every barrel of refinery intermediate stream or blend stock had access to every refining process that could make use of it.

In other words, a blend stock that is produced in Refinery A can immediately be processed by excess capacity in Refinery B, and so on and so on. That's in the nature of such models.

Obviously, in reality, one only has limited capability to do that. And so the aggregate refinery is representing in effect more capacity than there really is. And that's where the bias for its understating costs emerges.

Now it's not a disabling bias. It's not, you know, in our view something that, you know, disqualifies this kind of analysis. And, indeed, the overoptimization tends to be similar in nature as one goes from case to case.

So you can still make cross-case comparisons of the results in the face of that optimization. But I wanted to, you know, point out that that tendency does exist. And in order to quantify it, you need to do some fairly tight analysis.

What I want to say in this area of discussion of cost is that the cost that we reported -- now this may seem like an obvious statement, but yet I think it's important to make -- these costs and import volumes both that emerge from our analysis, they are the result of interactions between the CARB standards, which are on the books, the CARB emission standards, the predictive model and the way it transforms gasoline properties into emissions testaments. That's on the books.

Thirdly, refining techno-economics, in other words the representation of the way refineries behave, which is captured in the refinery model through the calibration, and the supply and disposal functions, it's the way all four of these things interact. That's really key. You take away any one of those, if you don't have to meet the predictive model requirements, if you don't have access to imports, if you can't have disposal functions, then these numbers will change.

It's really important to understand that these costs are estimates that are based on exactly these four factors interacting. And that interaction, particularly between the

predictive model and gasoline properties, is just extremely important in leading to these results.

We, as I discussed before, were able to demonstrate that the costs are sensitive to a number of assumptions, including supply functions, disposal functions, and the way the predictive model is used.

And finally my last comment is that our reported costs or our incremental costs that apply within the context of refining operations, our analysis, in effect, stops at the refinery gate with the exception of the mileage loss. These are average costs that are incurred in producing CARB gasoline.

It's in the nature of these analysis that average costs are less that the marginal cost in making the last barrel. And they are, indeed, costs at the refinery gate. And the analysis doesn't address any phenomenon that change economics downstream up until the pump.

So that's the extent of what I wanted to say about the refinery modeling for the moment.

Thank you.

PRESIDING COMMISSIONER SHARPLESS: Thank you. Well, we take to heart your cautions, and your conditions, and recognize the complexity of what we're working with here.

Rather than take questions on testimony that we've heard, I want to turn right now to Dan Chang, who is here. He's the Chair of the Civil and Environmental Engineering Department at U.C. Davis. And he's here to discuss the overview of the U.C. Davis Study. He had limited time.

I appreciate you coming, Dr. Chang, to be with us here today, and offer you the podium at this time.

DR. CHANG: Thank you. I'm glad to be here and speak before the Commission Members.

I'm representing the University of California's Toxic Substances Research and Teaching Program, that's this TSRTP.

Can you hear me if I'm away --

PRESIDING COMMISSIONER SHARPLESS: No, you really need to use the microphone.

DR. CHANG: I'm afraid I'm going to block the --

PRESIDING COMMISSIONER SHARPLESS: The view.

DR. CHANG: -- the view.

So I'm representing the U.C. Toxic Substances Research and Teaching Program that was charged by the University to address the Senate Bill 521 legislation requesting a review of the status of the MTBE, from both the perspective of health and a variety of other specific questions.

I'm an environmental engineer, and I like to introduce myself by saying that when I talk to my students in the classes I tell them that, well, you're learning to be an environmental engineer. An environmental engineer is a jack of all trades and master really of none. So you have to learn about a lot of different subject areas. And then I also remind them that a little bit of knowledge is a dangerous thing and, ergo, environmental engineers are potentially very dangerous people.

So I really want to state this because this issue is very complex. And if anybody said that, any single individual said they totally understood all of the issues with regard to the use of oxygenates, particularly of MTBE in gasoline, I think that you'd need to examine very carefully what they are saying.

So we have a team of scientists, both on the physical science and biological sciences side, throughout the U.C. system, and also engineers that contributed to this report.

Some of the principal investigators at the different campuses are represented here. And I simply want to point out also, on this particular slide, that you notice that there is this et al. Et al is all those graduate students and staff researchers that contributed to this report on which the backs of research is carried out at the University. And so they really should be acknowledged.

And I simply want to point out to you that in the report, which is now available on the web, so it was posted last night, it is now available on the web. So right up here is the website. You can get the full Executive Report, Executive Summary. I'm only going to highlight a few items from this Executive Summary. The report itself, the full text of all the sections, is on the website.

Unfortunately, it will be a couple of weeks before they are able to scan in and get into the Adobe Acrobat PDF format, all of the figures. So some of the figures and tables are missing but all of the text from the various investigators in the U.C. system are up there.

And I should say that this probably involves over 50 scientists throughout the system. My role in there was primarily, at the U.C. Davis Campus, was one of a coordinator. I was co-principal investigator with John Reuder (phonetic). We were primarily looking at the transport and fate issues regarding MTBE, also looking at what could be done in terms of remediation and what might occur in terms of exposure, and then running a few toxicological assays. So in a ten-month period it's very difficult to generate new data.

I'm proud to say in a sense that you will find in this report there are new data. Some of it is confirmatory of older studies in toxicology that were conducted, and some of them are new.

We have some new information with regard to biodegradation of methyl tertiary butyl ether. And that is perhaps what I was involved in, as I am an engineer that's working on the biodegradation of methyl tertiary butyl ether along with my colleagues.

Having said that, let me simply try to go through a few of what we consider to be the most significant findings perhaps that would have a bearing on what the Energy Commission has before it today in terms of the availability of the energy supply.

One of the things we might come away with, that we collectively believe, is that the important aspect is the California reformulated gasoline. And, in particular, this Cal RFG 2, the Phase 2 requirements for the gasoline, give us the air quality benefits. So the primary benefits that are obtained are from the use of the reformulated gasoline.

And that reformulated gasoline does not have to have oxygenates in it in order to be able to obtain those air quality benefits. That's one of the key things that we would like to get across.

Certainly the presence of oxygen in the gasoline is one that was driven by a congressional mandate in the Clean Air Act amendments. There were certainly advantages from the economical perspective and availability, as you well heard, I'm sure today and will so in the future, with regard to the availability of the oxygenates and which oxygenates can be used.

But the air quality benefits can be achieved, we believe, using California reformulated gasoline Phase 2 requirements that does not require then the insertion of oxygenated compounds, which is not to say that we should do that. I mean, we may still need that.

Now the second conclusion on here probably is a no-brainer. But if we continue to use MTBE the risk of exposure into the groundwater supply and contamination of groundwater supplies and surface water supplies continues. So I don't think that there's too much question with regard to that.

But the primary threat in a sense to the water supplies is to the groundwater supplies. I think that you'll find in the report that surface water supplies, there are strategies

that could be taken to protect surface water supplies without necessarily taking oxygenates out of fuel, again, at a cost.

Another conclusion, some sort of in a sense good news in a certain sense, is that for the general population the risk of exposure to MTBE contamination, contaminated waters at levels that would be unhealthful is, we believe, quite low. In part that's because the state is moving towards certain primary standards and secondary drinking water standards. And we believe that the water industry is not going to deliver to consumers water that the consumers do not trust. There's already a lack of trust out there. But they certainly will not be wanting to deliver water that they can't trust.

There's a downside to this, we believe, though. And that is that those public supplies that are produced by the larger companies will be tested, so there will be a testing program in place.

Unfortunately, public supplies are not the only source of drinking water. And so people that are on private wells and things may have a risk of exposure.

The upside is that typically they don't live in very, very urbanized areas and therefore the supply or the probability of having a contaminated supply of groundwater is lower. Okay. But, on the other hand, we know that from experience already that it can occur in a small community. So Glenville probably is a good example of that having occurred from a single service station that had a leaking tank.

What we have found, as part of the study, is that there are some very important data gaps in understanding both the acute and chronic toxicity of methyl tertiary butyl ether. And I've added, from my perspective, the byproducts of the use of any type of fuel additive.

Oftentimes, in our society, we don't have in place the mechanism to study necessarily all the byproducts. If we look at the primary chemical compound we know that oxidation byproducts of methyl tertiary butyl ether can produce certain types of compounds

of tertiary butyl formate, tertiary butyl alcohol, formaldehyde. Some of these compounds are not well studied with regard to their acute health effects.

And unfortunately there seems to still be, even at this time, very relatively little or no research currently being conducted with that regard. And in the U.C. Study, it's so short that you certainly couldn't generate new chronic health effects data.

So data also, from my perspective, on some of the alternatives is less than it is for MTBE. MTBE of many types of compounds that you would find in gasoline is probably one of the better studied chemical compounds. And so some of the alternatives we believe the data for those compounds is even less than it is for MTBE.

And certainly some of those other compounds share the detrimental types of features of the ether oxygenates. And again from the perspective, I think, of the collective wisdom of the people that worked on this report from the University of California, substitution with additional ether compounds is probably not a very wise thing or a wise direction to take.

Okay. The costs of treating the water sources that become contaminated could be very large. And there's quite a bit of uncertainty in the economic analysis. As you can see, the remediation of underground storage tanks and leaking pipelines and spills is the larger driver of that uncertainty and the economics. It ranges from tens of millions of dollars per year to hundreds of millions of dollars per year.

So it puts it essentially, as I read the Energy Commission summary, into the ballpark potentially as the costs of changing over the fuel system and at different time scenarios.

Okay. So part of that cost uncertainty is driven by the fact that some new treatment technologies are not -- we have not developed a cost for those new treatment technologies. And so we're uncertain as to what the upper bound cost would be for those technologies.

In particular, biological treatment, we now know that MTBE is biodegradable, that there are naturally occurring microorganisms that biograde MTBE. We have them in the lab. People have developed them. But there's no good field data that validates that biological degradation of MTBE has actually occurred or is occurring.

What we believe is true is that the biological organisms, these microbial organisms, they exist. There seem to be a variety of them. They're not as prevalent perhaps as some of the more common ones that eat or utilize the components, more readily degradable components of gasoline, such as benzene, or toluene or, you know, the B-tex types of compounds. But they're out there.

And so since there's only a field test, I believe, is not underway at Port Hueneme, I believe that Shell Oil Company is conducting one with the Navy currently at Port Hueneme. So how effective treatment in the field applications will be is still uncertain.

Another cost that's driving some of the annual costs will certainly be continuation of monitoring, which I assume is going to go on for awhile, whether the oxygenate is there in the supply or not, because we've already had some leaks that have occurred.

Those things are on the order of tens of millions of dollars a year in this economic analysis. And what we might say is that there is again potential for economic losses to the economy as a result of loses, for example, in recreational income from requirements on then managing surface water supplies.

So in sort of coming away from this, looking at recommendations now in terms of specific sorts of findings, one of the lessons that we take away from looking at this study is that whenever you add in a significant amount of chemical compound into gasoline, when it becomes a significant fraction, it's going to get out there into the environment. And you may have some unexpected environmental consequences as a result.

So MTBE had been used in gasoline since about the late '70s, right around 1979. '80 it started to be introduced in gasoline but at smaller concentrations. And now we've seen in order of magnitude increase.

We weren't seeing at first those problems associated with the lower concentrations of MTBE. MTBE has gone from probably a no-name chemical that was used in some special laboratory types of applications to the second most widely produced organic chemical in the United States. And that's going on worldwide. So MTBE use is not just here in the U.S., but all over the world the refineries have geared up to use it.

So when you introduce that into something that's so prevalent as gasoline you're going to get it into the environment.

As a result we would recommend strongly that whatever, whatever is done, that a full environmental assessment, more of a lifecycle assessment be conducted, or even the alternatives to MTBE in the California reformulated gasolines. And that includes the gasoline itself. In many ways, from my perspective, the things that are naturally there as part of the gasoline which probably is more than, you know, in reasonable amounts probably more than 400 different organic chemicals. It's not clear that the toxicology of those is as well understood. Certainly they don't share all the properties that make it as mobile as the methyl tertiary butyl ether, or the other ether compounds, nonetheless.

So I guess the bottom line in a sense is that you'll find that the report recommends we consider phasing out MTBE over a period of several years rather than, you know, just an outright ban. And for the reasons that I've mentioned we don't know enough about what we might put back in place into the gasolines.

There is a lot of uncertainty still about the health effects of some of those other compounds and potentially some of the relative costs. And by delaying you'll know better what the ultimate cost will be.

And in a certain sense, you know, the economists like to look for where the tradeoff is, for how long you could continue to produce it, defer those costs of the changeover from the increased amount of spill that's going to occur or leaks that will occur to the groundwater supply and the clean-up. And it's probably out there at several years some place. But by waiting a couple years I think we'll know those costs a lot better.

We also recommend the refiners be given flexibility to achieve the air quality goals, objectives. That is gone into a little bit more detail. Perhaps we at the University got a little bit outside of our area of expertise in a sense, but we believe that providing a wider range of flexibility and still meeting the California Reformulate Gasoline Phase 2 requirements will provide, when it's done on a season and regionally-specific basis, will provide the greatest benefit to society.

That's all I have to say. And so again I hope I just tantalized in a sense a little bit of what you want to see why did they conclude that. The report is on the website. And I encourage you, those of you that are interested, to read it.

Thank you.

PRESIDING COMMISSIONER SHARPLESS: Thank you, Dr. Chang. I just wanted to ask you one question.

Your study's emphasis was on MTBE.

DR. CHANG: That's right.

PRESIDING COMMISSIONER SHARPLESS: Did you look in any depth to any of the alternatives that the CEC has in its report?

DR. CHANG: Yes, Jan. There is review that was carried out of the health effects of several of the leading alternatives by Professor Broins (phonetic) and his team of researchers at UCLA. So that's in one of the reports in the health assessment.

PRESIDING COMMISSIONER SHARPLESS: And can you tell me what those findings were?

DR. CHANG: Again I'm not a health professional --

PRESIDING COMMISSIONER SHARPLESS: A toxicologist?

DR. CHANG: -- or toxicologist. My sense was that there are some uncertainties even with a compound as simple and common as ethanol with regard to the fact that again you produce in the atmosphere acetaldehyde as opposed to formaldehyde. So there are health issues associated with the other oxygenates as well.

PRESIDING COMMISSIONER SHARPLESS: So some of the issues we're looking at are water-related. Some of the issues we're looking at are air-related.

DR. CHANG: Related. Yes, that's correct.

PRESIDING COMMISSIONER SHARPLESS: And is there any effort to continue the study on the other oxygenates?

DR. CHANG: Well, I'm sure the investigators that have spent this year looking at this problem, many of them will continue to do so. But, as I mentioned already, as far as we can see, as far as we know, there's no significant research program that has been funded that is underway. So it will be whatever researchers can scramble with.

PRESIDING COMMISSIONER SHARPLESS: Well, Dr. Chang, thank you very much for sharing your results with us. It is, in fact, an important input into the decisionmaking process. It is a part of the study we left to the researchers under your program. And I think, when you put all of the information together, California is going to have a much better basis on which to make a reasoned decision.

So thank you very much for coming and sharing. We look forward to seeing the full content of the report.

DR. CHANG: Right. If you got an Acrobat Viewer, you can do it today.

PRESIDING COMMISSIONER SHARPLESS: If I got a couple of months to read it?

DR. CHANG: Well, no, no. It's up on the website, as I mentioned. And if you have an Acrobat Reader, you can just pull it down now. And I was told by Professor Last (phonetic) that the figures and tables, hopefully, will all be up there in a couple of weeks. The report was just delivered to the Governor's Office yesterday.

PRESIDING COMMISSIONER SHARPLESS: Okay.

Commissioner Moore, any comments?

COMMISSIONER MOORE: Thank you very much, Dr. Chang.

PRESIDING COMMISSIONER SHARPLESS: Thank you, thank you for your time.

Now sort of going back to the CEC focus here. Perhaps, Mr. Hirshfeld, I can come back to you before we start with the public comment.

For those of you in the audience, I now have six cards. I would like to break for lunch. I am aware there are couple of you that are time constrained, and I will take you first. And I suspect we can do this fairly efficiently.

But I did want to go back to Mr. Hirshfeld, before we opened it to public comment, to talk about one issue that you haven't covered.

And that is oftentimes what California does the rest of the nation follows. Now in our projections we're looking at basically if California discontinues the use of MTBE, these will be the implications: What if other states follow suit? Does your model have the capability to run those figures? Have you run those figures? Where are we?

MR. HIRSHFELD: Yes. The answer to that is, from our standpoint, from just our aspect of the analysis, a ban across the U.S. would translate or would be expressed as changes in the supply curves, because now you would have large -- you know --

PRESIDING COMMISSIONER SHARPLESS: Much greater demand.

MR. HIRSHFELD: -- more extension, competition, greater, greater demand.

PRESIDING COMMISSIONER SHARPLESS: Right.

MR. HIRSHFELD: And we would expect then to see more costly, higher prices for these and the imported oxygenates and the analysis as it was sketched out. Going back to our Task 1 report, it essentially had a set of California-only ban cases and a matching set of U.S.-ban cases.

Now because of the press of time we ran actually a larger set of California-only cases and a relative smaller set of U.S.-banned cases. But the answer, number one, the analysis did contemplate that. The way it would be -- number two -- the way it would be expressed would be in modified supply curves which would be more costly. And, number three, our findings, of course, are correspondingly higher cost for California if, as you suggest, the ban becomes more widespread.

So I think if you look at sort of all the results of the study that possibility is represented. You can at least see what the economic consequence to California would be.

PRESIDING COMMISSIONER SHARPLESS: But they're not reflected in the numbers Mr. Schremp talked about in terms of the intermediate on the high end being 6.7 cents, and the long term being in the range of -- what was it -- 2. --

MR. SCHREMP: Up to 2.5 cents.

PRESIDING COMMISSIONER SHARPLESS: 2.5 cents.

MR. SCHREMP: For ethanol.

PRESIDING COMMISSIONER SHARPLESS: Two and a half cents. So the nationwide implication is not reflected in those figures; is that right?

MR. HIRSHFELD: That's correct, that's right.

PRESIDING COMMISSIONER SHARPLESS: Okay.

MR. HIRSHFELD: Again, though, they're to be found in the Task 3 report, but not in the summary.

PRESIDING COMMISSIONER SHARPLESS: Go to the bigger report.

MR. SCHREMP: And, Commissioner Sharpless, at least for the ethanol case, of a U.S. ban, those are mentioned in our Executive Summary, I believe, in the final paragraph. And that range is 6.7 to 11.7 cents per gallon increase in cost.

PRESIDING COMMISSIONER SHARPLESS: If what, Mr. Schremp?

MR. SCHREMP: If the phase-out of MTBE were extend to the rest of the United States.

PRESIDING COMMISSIONER SHARPLESS: And assuming that other alternatives were used?

MR. SCHREMP: In this particular case, those cost estimates refer to the use of ethanol to completely displace MTBE.

PRESIDING COMMISSIONER SHARPLESS: Has anybody done a run on what would happen if you removed all oxygenates?

MR. HIRSHFELD: From California gas?

PRESIDING COMMISSIONER SHARPLESS: No.

MR. HIRSHFELD: Oh, across the country. Okay, so everybody would be making federal reformulated gasoline sans oxygen. I don't think so.

MR. SCHREMP: No, we did not make that run. But what would change in our modelings is we would assume that Arizona gasoline and any conventional gasoline produced by California refiners would also have no oxygenates. And that's about the only change you would have to make in our modeling to handle that case.

The fact that refiners in other areas of the country were producing a no-oxygenated gasoline might affect, say, the outlet supply curves possibly.

MR. HIRSHFELD: It would, yes. I don't mean to sound parochial in answering your question. But for our

part of the task, extending the ban outside the borders of California would come back to us and would be reflected in our analysis, as I say, in changes in supply curves and, as Jeff says, changes in the specifications of conventional

gasolines --

PRESIDING COMMISSIONER SHARPLESS: Right.

MR. HIRSHFELD: -- and reformulated gasolines exported. And so, as I say, we have partially analyzed those situations but not as fully as we did just the in-state ban.

PRESIDING COMMISSIONER SHARPLESS: Fine. Well, I remember what we were talking about in terms of scope of work. And as we get into the issues our scope broadened. But given the testimony we just heard from Dr. Chang, and if there is a heightened public concern about oxygenate, or alternatives, or compounds in general, then I would suspect that anybody considering an alternative is also going to consider the environmental tradeoffs. It just goes to reason. Why spend money if you are not going to get the benefit from it, right?

MR. HIRSHFELD: Yes.

PRESIDING COMMISSIONER SHARPLESS: Okay. I would like to start with Megan Smith, American Bioenergy Association.

MS. SMITH: Good morning, Commissioners. I'm Megan Smith, and I'm the Director of the American Bioenergy Association. Thank you for allowing me the opportunity to testify on behalf of my Association regarding the alternatives to MTBE in gasoline. California has a great opportunity to support an emerging California-based industry. That is, biomass conversion to ethanol.

I came out to California some five years ago to explore the potential of biomass ethanol in the state. We have discovered that California has enough biomass waste resource to produce four billion gallons of ethanol per year. That's approximately three times the amount needed to displace the MTBE now used in California.

But what is biomass? Biomass is any matter composed of ligneous cellulose. Examples include wood, grasses, agriculture residues and the paper component of municipal solid waste.

The benefits of bioethanol are many and far outweigh the RVP problem ethanol is always condemned for. The current ethanol industry converts to ethanol only part of their available biomass. That is the starch inside the corn kernel itself. The rest of the plant is biomass.

This is where corn or starch-based ethanol and biomass or cellulose-based ethanol differ. Aside from ridiculously low oil prices currently, corn ethanol cannot compete with gasoline without its tax incentive due to the high feedstock price of corn.

Biomass, on the other hand, is a less expensive feedstock, much of it regarded as waste. Also biomass ethanol plants supply their own power, through conversion, of biomass' lignin component. These two things, the cheaper feedstock costs and self-supporting energy supply, make biomass ethanol more cost effective.

Because of this difference biomass ethanol will be able to directly compete with gasoline in the very near future.

Biomass ethanol can help eliminate municipal solid waste, agriculture and forestry residues. Many landfills in California are turning away waste only to find there are few other disposal options.

The decrease of allowable open-field of rice straw has forced the rice farmers in California to find another disposable system for their crop residue.

California's Committee on Alternatives to Rice Straw Burning has determined the conversion of rice straw to ethanol as one of the few viable options.

In addition, yard and orchard trimmings and even

pecan shells may in the future actually acquire value, increasing farm income.

Biomass to ethanol can help make forests safer and healthier as well. Forest fires stemming from immense fuel-loading have severely threatened human life and property.

Biomass ethanol can therefore help California alleviate air pollution by converting rice straw and forest residues to ethanol that would otherwise burn.

Also money for the state would be saved by preventing necessary firefighting practices which are extremely costly to California to conversion of forest thinnings to ethanol.

Biomass ethanol can improve biomass power economics. As you know, California has recently lost almost one-third of its capacity supplied by biomass power plants. A biomass ethanol plant generates enough energy from biomass' lignin component to actually operate the plant and still have excess electricity left over for the grid.

Coupling of a biomass ethanol plant to the power plants may keep some of them operational through improved economics.

Three biomass ethanol plants totaling about 50 to 60 million gallons per year are now in the planning stages in California for production about three to five years from now.

One will convert rice straw. One will convert rice straw and wood waste and will be sited at a biomass power plant. And the other will convert only wood waste and will be sited at a lumber mill.

On October 20th of this year a ground-breaking ceremony took place in Jennings, Louisiana to retrofit a starch-based ethanol plant to use of sugar cane bagasse as its biomass resource.

California therefore will have the benefit expanding on the learning curve of this first plant which will make operation of California biomass ethanol plans that much easier.

Biomass ethanol plants will employ about 100 people directly and 500 people indirectly at each 20-million-gallon plant for year. These plants are usually sited in low employment, rural areas which are close to their feedstock source.

In summary, the State Legislature asked for an evaluation of environmental benefits for MTBE alternatives. I believe I have addressed some of these benefits for biomass ethanol. But to expand this industry quickly to displace MTBE is going to require a commitment from California.

I believe that if we don't use corn-based ethanol in the meantime we may lose our opportunity for biomass ethanol eventually, as it will be hard to resurrect the oxygenated fuels program if it's made optional through legislation such as HR 630.

The corn ethanol industry claims it can rise to the occasion of supplying most of the MTBE replacement supply within a few years by expanding their existing capacity. If California gave the Midwest this opportunity, biomass ethanol could eventually be phased in to displace Midwest ethanol.

None of the barriers to using ethanol as addressed in the CEC report are insurmountable. Biodegradable California-based ethanol could provide California with as many benefits if these barriers were taken down.

As a closing thought, Commissioners, please don't let California throw the biomass ethanol baby out with the MTBE-contaminated bath water.

Thank you.

PRESIDING COMMISSIONER SHARPLESS: Thank you, Ms. Smith.

I take from your comments what you'd like to leave with us is that more ethanol supplies are coming based on your first testimony?

MS. SMITH: Right.

PRESIDING COMMISSIONER SHARPLESS: But it does not affect at least the assumptions for the supply curves you see in our report. You're not asking us to modify our information within the report?

MS. SMITH: I do wish the report had taken into consideration that biomass ethanol will be coming on line right about the time that this report, you know, the end time line for six years. That's about when our production will begin.

PRESIDING COMMISSIONER SHARPLESS: And which production is that, the California production you've been talking about?

MS. SMITH: Biomass ethanol in California.

PRESIDING COMMISSIONER SHARPLESS: And what did you say the supply level was for those facilities?

MS. SMITH: About 50 to 60 million gallons per year, which is about five percent of the total you need. But I also see that once these plants get off the ground, once they're proven, because these are the first of the type plants, they're just going to start multiplying all over, especially if there's a market right here in California. We'd hate to make the ethanol here in California and ship it over into another state. I mean, that would be a shame.

PRESIDING COMMISSIONER SHARPLESS: And the second half of your comments is more directed at policy issue about what choices California might follow if they were to discontinue MTBE. You have a concern about passage of HR 630?

MS. SMITH: Yes. I think you addressed it a little bit today. If you start going down the road of making oxygenates optional in California, other states -- and I worked in Washington D.C. and I know this too well -- there's other states that may say, "Well, we have problems with MTBE; we want to do the same thing." And then you see the whole Clean Air Act may be open up for debate, et cetera.

PRESIDING COMMISSIONER SHARPLESS: Well, of course, the whole Clean Air Act will be open for debate because its reauthorization comes up in 1999.

MS. SMITH: Right. That's true, that's true. We were afraid it was like to happen this past year.

PRESIDING COMMISSIONER SHARPLESS: More to follow, huh?

MS. SMITH: Right.

PRESIDING COMMISSIONER SHARPLESS: Okay. So those are essentially your two points. But with respect to any additional new information that we might want to consider or need to consider before we finalized this report, you don't --

MS. SMITH: One of the main differences I thought, in talking with the Renewable Fuels Association, they said that they could rise to the occasion, like they said, of increasing the capacity in the Midwest corn ethanol plants pretty quickly. And they could supply a lot to displace MTBE out here fairly quickly. And I don't think that that came through in the report. I think it was disregarded because of the cost. It wouldn't be cost competitive, so they'd keep it in the Midwest. But that's not what the larger producers are saying.

PRESIDING COMMISSIONER SHARPLESS: Well, certainly we heard the explanation by our consultant about how you value the products and the two opportunities there. If you have any additional information that you haven't already provided us that would be helpful.

MS. SMITH: Okay, that would be great.

PRESIDING COMMISSIONER SHARPLESS: Thank you.

MS. SMITH: Anything else?

COMMISSIONER MOORE: No, thanks.

MS. SMITH: Okay, thank you.

PRESIDING COMMISSIONER SHARPLESS: Another person with time constraint I believe is John Lynn, American Methanol Institute. Mr. Lynn?

MR. LYNN: Thank you, Commissioner Sharpless and other members of the Commission and the Staff. I appreciate your indulgence.

I want to compliment you on conducting this workshop. It's clearly bringing out a lot of additional information and some different viewpoints that I think will be very valuable in your final product.

I am John Lynn from the American Methanol Institute in Washington. I have provided you with an official copy of my statement, so I will try to summarize my main points.

Three things that we would like to point out about your study. First, we believe that additional attention needs to be paid to the tax revenue and highway funding implications of California utilizing other oxygenates and additives besides MTBE.

Secondly, we believe -- and you made mention of this in some of your questioning earlier -- that the risk of price shocks and gasoline shortages in a less-than-fully optimized system is quite considerable and may range in the devastating and catastrophic range that was cited for an immediate phase-out of MTBE.

Thirdly, I like to talk you a little bit about potential water quality issues. Ethanol receives a federal excise tax subsidy of 54 cents per gallon. You estimated that the potential demand for ethanol would be about 75,000 barrels per day under the three-year phase-out of MTBE. Seventy-nine thousand barrels per day was your estimate for a six-year phase-out. That translates into an annual demand of about 1.15 or 1.2 billion gallons of ethanol each year. With a 54-cent excise tax subsidy on each gallon of ethanol California's contribution to the Federal Highway Trust Fund may be reduced as much as $650 million per year.

Earlier this year in April, Assemblywoman Debra Bowen asked the Federal Highway Administration for quantification of what that would mean in potential loss of highway funds for California. Because of the reauthorization of the Highway Bill currently under consideration they could only give her a rough estimate estimation at that time.

Since then the new Highway Bill, T 21, has been enacted. Our calculations, in collaboration with officials at the Federal Highway Trust Fund, indicate of the 2.4 billion a

year in federal highway funding that California is now scheduled to receive, as much as one quarter of that funding could be in direct jeopardy with that utilization level of ethanol.

There's a gap in your study about this particular point. And we think, such as you were mentioning earlier about additional areas of study, this is something that the Commission should take a strong and much closer look at, what the potential loss of federal highway funds would mean with the greater utilization of ethanol.

The second area that I mentioned, and Mr. Hirshfeld alluded to this also, is that there is a bit of a bias in his study and in the Commission's draft study, because of the analysis that treats all the oil companies as if they were one big refinery.

Real-life experience, the real world, tells you that things can happen. We saw what happened with shutdowns, a fire at a refinery I guess in the last year or so that led to a 30-cent-a-gallon price hike here.

That's a classic example to me of the uncertainties you were referring to earlier and the risk. And as near as I could tell from the answers the factor of risk and uncertainty is not readily apparent in the calculations that the Staff have put forward in its initial study.

We think that that analysis, therefore, is overly optimistic on the mechanization of the price effects in both the three- and six-year terms. That situation could be far more volatile. And we urge you to take a much more cautious and in-depth approach to that aspect of the study.

PRESIDING COMMISSIONER SHARPLESS: How would you recommend we do that, Mr. Lynn?

MR. LYNN: I'll be very happy to memorialize our specific suggestions in a letter to you in the next few days.

But there needs to be, in my personal opinion, there needs to be a greater recognition of real-life experiences. Droughts happen, natural disasters. Two years ago this summer you saw corn go to five and a half dollars a bushel. When that happens, ethanol

plants shut down. Now those are real-life experiences. And they somehow, some way have to be factored into the computer runs and all the other technical evaluation.

And I think there's a way to do that. I don't want to get off point here, but we've got a worldclass carrier heading to the Persian Gulf this morning, getting ready to launch missiles against a major oil producer, a member of OPEC, whom we depend on. Over 50 percent of our supply of crude oil into this country comes from that region of the world. And we've seen what happens when you have a cutoff of that supply.

Nowhere in this discussion this morning or in the report have I heard any mention whatsoever about one of the original purposes of the minimum oxygen standard. It had to do with national security. It said every gallon of gasoline in California means that 11 percent doesn't have to come from the Middle East or some other foreign source.

So the national security justifications for the oxygenate program should be taken into account.

PRESIDING COMMISSIONER SHARPLESS: Again, Mr. Lynn, we're walking a line here between policy issues and issues of trying to put together a part of an overall study that does a comparison. So don't misinterpret the Staff's report and what it's intended to do.

I think that there is a desire sometimes to take the information that we have in the report and extend it into the policy area. It's not intended to deal with policy issues.

It's intended to be used as a comparison document, a comparative document, "What if, what if, what if." And obviously there's a bizillion possible assumptions and scenarios that are part of the "what-if" scenario.

But there's some things that can be modeled and some things that can't. And that was part of my question to Mr. Brady in terms of the risk factor and how he dealt with risk. I'm not sure. And if you have a better way to deal with the risk, that's kind of the question. If

you have a better way that we can deal with risk without running it out ad infinitum so that the document no longer becomes of any value.

MR. LYNN: Sure.

PRESIDING COMMISSIONER SHARPLESS: But we do have to take into consideration all the other policy issues. But this is not the document that we're trying to do that in.

MR. LYNN: I understand and agree with you. And we'll be glad to give you some specific suggestions on that. And I don't want to be in any way critical of the Staff's effort. Quite frankly, I think, given the timeframe and the sense of urgency, you all have done a phenomenal job. What you've done is created an intense interest in my organization and quite a few others to come in and participate a little more actively than maybe we should have been doing some time before.

And I am encouraged by the concern expressed by you indirectly and by some of the other witnesses this morning about being careful of what is said in an official context and the projections that are made, because people are a lot more sensitive now to that rule of unintended consequences and unforeseen results.

And in that spirit the final point I wanted to make with you is that your document refers to the fact that the alternative oxygenates cause water to taste and smell unpleasant. And in an effort to add some scientific evidence to this discussion, perhaps not so much for your own report but for those others that are looking at this, the American Methanol Institute has commissioned a study on the fate of ethanol in water and the environment.

And I have provided you with a copy of that report. It does contain information that raises a question, a concern of which most people are not aware. And that is that the presence of ethanol will have the effect of extending the plume of a spill much further than its original source than if ethanol had not been present in the fuel.

We'll let others evaluate this, but this is the opinion of the scientists and the environmental engineers that prepared our report. That report is not an isolated document. We have commission a series of reports. And the next one is going to be on the fate of methanol in the environment.

Our industry certainly has had a wonderful association with California and with this Commission in the past. We're proud of the fact that methanol has been utilized in your mass transit systems and your M85 system, and we hope it will be utilized even to a greater extent in the future, which places a special responsibility on us to provide you with information, the best information we can, about its characteristics in the environment.

So thank you very much.

PRESIDING COMMISSIONER SHARPLESS: Thank you, Mr. Lynn. And we look forward to any comments you might forward on to us.

Mr. Manning?

MR. MANNING: Thank you.

Good morning, Commissioners. My name is Ed Manning. I'm with Kahl Pownall Advocates here to represent the Western States Petroleum Association today.

With me to help answer questions you might have are Al Zustovich from Exxon, Chuck Morgan from Mobil and Mike Kulakowski from Equilon, all of who have worked very closely and cooperatively with your Staff, which we appreciate.

First of all, I think the theme of our comments is how to improve the report, specifically how the report can better frame the issues, and how the summary in particular might be changed to better frame the issues.

The CEC report is critical in the quest of policymakers to resolve what, if anything, should be done about the continued use of MTBE as an oxygenate in gasoline. Decisionmakers from the Governor to the Legislature will be relying heavily on this and other reports.

For that reason the report must accurately portray the potential impacts and risks associated with the ban or a phase-out of MTBE.

WSPA agrees with the report's conclusion that an immediate ban of MTBE would have catastrophic economic impacts in California. However, the potential cost impacts shown on the report for the mid-term and long-term cases, in our estimation, show a most favorable cost scenario and should be reevaluated by the Energy Commission to take into account the full range of cost risks.

Recognizing that reality, the potential cost impacts associated with both the mid-term and long-term option need to be addressed more directly in the summary, because we believe that the summary is obviously the document that's going to be read the most and have the most influence on the people who are going to be using this information to make important policy decisions.

And getting back to a comment you made earlier, the things that can't be modeled should at least be mentioned in the summary. And we think that's important point because, as you pointed out correctly, not everything can be modeled.

With these changes, the report would reflect the full range of possible cost impacts from the best case to the worst case. Understanding this range of risk is critical, as I said, for policymakers relying on the report. WSPA's suggested changes would ensure the report is not misinterpreted, thereby providing decisionmakers with a false sense of security about the ease of the transition from MTBE to other oxygenates. And many of the oxygenates featured in the summary have unknown environmental impacts and therefore may not be realistic in the short term, mid term or long term.

The following comments summarize what we've given to you in our written comments to the report.

First, CEC's most favorable cost scenarios for an MTBE ban, as I mentioned, feature the use of alternative oxygenates such says ETBE, TAME and TBA, that have been

inadequately evaluated for environmental and consumer risks and, therefore, in our estimation, are probably not realistic alternatives.

WSPA believes these oxygenates have some properties similar to MTBE. Therefore, the only realistic alternatives to the continued use of MTBE are ethanol or the no-oxygenate case. Even in the case of ethanol, some questions have been raised today and in the University of California report that need to be answered. All of these points should be made clear at the beginning of the report summary so that it frames the issues properly for decisionmakers.

The report also fails to address the potential outside cost risks of the ethanol and no-oxygenate scenarios. More specifically, the transition to ethanol or the no-oxygenate case raises a number of potential cost impacts that we don't think were fully accounted for.

First, the cost of ethanol could be driven higher than stated because California would require most of the ethanol that is now supplied to other domestic markets. The cost risks of bidding ethanol away from Midwest user's needs to be evaluated since California suppliers would likely bid up the ethanol value sufficiently beyond what current customers pay.

WSPA has worked with the DeWitt and Associates, a recognized expert in oxygenate economics. And it is their view to us that market forces could lead to higher costs than accounted for in the study.

PRESIDING COMMISSIONER SHARPLESS: That's an interesting point. And I actually thought that that had been taken into account. Particularly in the intermediate term where there would need to be renegotiations and some level of market equilibrium occurring.

Are you referring mainly to the intermediate, or are you referring both to the intermediate and the long term?

MR. MANNING: I think we have more concerns about the intermediate, but concerns about both. And my testimony will get into --

PRESIDING COMMISSIONER SHARPLESS: So are yours more directed on the supply curves that have been produced on the ethanol additive?

MR. MANNING: Yes. Ethanol specifically. And I think most of our concerns are not -- I have plenty of folks with me that can help answer the precise questions -- but are on the intermediate case. And I'm going to talk the little bit about some of the reasons why.

PRESIDING COMMISSIONER SHARPLESS: And with that specific comment, though, it's specifically on the supply curves for ethanol?

MR. MANNING: Chuck, do you want to speak?

MR. MORGAN: I have to speak for some of the other members, too, on this. But, yes, there was concern that while this is one scenario that's portrayed in the report that there are other scenarios where you would have to pay a premium above and beyond what was portrayed in the report to dislodge this ethanol supply from the current users in the Midwest.

PRESIDING COMMISSIONER SHARPLESS: Have you spelled out those other scenarios in your testimony?

MR. MORGAN: Yes, we have. We've talked about that we think they need to be mentioned in the summary so that the total overall perspective on what the upside costs could be is adequately addressed.

PRESIDING COMMISSIONER SHARPLESS: Do you believe those other scenarios could be modeled or in some way calculated?

MR. MORGAN: We don't have a suggestion I exactly how to do that. But lacking that we would have least again like to make sure that it's emphasized in the summary that these costs could be higher for the reasons that we give in our testimony.

PRESIDING COMMISSIONER SHARPLESS: Some more cautionary notes?

MR. MORGAN: Correct.

PRESIDING COMMISSIONER SHARPLESS: Could I ask the gentleman to come back. And this is being recorded so it --

MR. MANNING: That was Chuck Morgan, from Mobil.

PRESIDING COMMISSIONER SHARPLESS: Okay. Great, thanks.

MR. MANNING: Let me get into some more of the specifics which is I think what you wanted to hear.

One example of a concern is the logistical and environmental issues arising from large increases in railroad car and tank movements. Moreover, we are concerned about the fact investors in railroad tankers and other facilities, which relate to the ethanol case, may hesitate to invest, given the prospect of changing fuel regulation.

All of these the types of uncertainties that affect pricing and also are the notes of caution that we would like to see in the report.

There are potential problems with the availability and cost of imported blend stocks such as CARBOB and Alkylate, that were not adequately addressed in the study. California currently produces almost all petroleum products that it consumes.

However, the CEC report shows large increased volumes of imports for both the ethanol and no-oxygenate cases. WSPA believes that the risks of importing up to 40 percent of product demand from outside of California are substantial and need to be described.

For example, we are concerned that they are not refineries out there that can supply more than minor quantities of the unique reformulated products required in California.

We question whether the transportation infrastructure is capable of moving such a large volume of gasoline, blend stocks, jet fuel, diesel fuel and rejected refinery materials on a sustained basis.

PRESIDING COMMISSIONER SHARPLESS: So in that case you're taking issue with Mr. Vautrain's assumptions, or his information?

MR. MANNING: Yes. I think the concern again is you can't precisely model this. But, yes, we're concerned that perhaps there's too rosy a scenario painted as to the ability of the infrastructure to be modified in the timetable we're talking about and at the cost we're talking about.

PRESIDING COMMISSIONER SHARPLESS: And again this is more directed at the intermediate than the long term?

MR. MANNING: Yes. I mean obviously our concerns are the quicker the time the less likely or the less rosy the scenario for us to be able to adopt the infrastructure.

PRESIDING COMMISSIONER SHARPLESS: Okay.

MR. MANNING: Future changes in nonCalifornia Fuels specifications, such as in Europe and the Eastern United States, will squeeze the availability of blend stocks available for import to California. And the rest of the world is also tightening gasoline specifications.

And we think again those scenarios are not fully taken into account in the report and the modeling done.

PRESIDING COMMISSIONER SHARPLESS: When you talk about the rest of the world tightening fuel specifications, can you be more specific?

MR. MANNING: We think that, as you said, what California starts the rest of the country and the world often follow. Depending on the future of MTBE, depending on reformulated gasoline requirements, not only here but around the world, it may produce demand for certain types of blend stocks that are also needed in California, as one example,

that may not be needed in the short term, but soon enough the demands maybe increasing. And so there may be competition for the same blend stocks that are not really accounted for in the modeling that was done.

PRESIDING COMMISSIONER SHARPLESS: And, again, this was a question of allowing the market to respond to demand. So the longer period that you allow the market to respond to demand and then equalize supply-demand, that would be the issue?

MR. MANNING: Arguably. But there are also uncertainties that we're concerned about, that I mentioned earlier. I mean a lot of this is regulatorily driven. And the uncertainties, just based on the discussion we're having about the future of MTBE, cause us concerns about the ability or willingness of investors to respond quickly. And those are all issues that are, we understand, difficult to predict and model. But those are cautionary notes we think help frame all these issues for policymakers.

PRESIDING COMMISSIONER SHARPLESS: Okay.

MR. MANNING: There will be an necessity to import sufficient quantities of a jet fuel and diesel fuel. This is one of the issues that's not really emphasized in the summary that we think has significant potential economic impacts.

We will have to import sufficient quantities of jet fuel and diesel fuel from out of state under the ethanol and no-oxygenate cases. The report assumes that this can be done at no incremental cost. And WSPA believes that there may be additional costs incurred to import these products from present markets. And obviously that affects --

PRESIDING COMMISSIONER SHARPLESS: Do you have any figures to provide the Committee that would challenge what we are using?

MR. MANNING: No, but these --

PRESIDING COMMISSIONER SHARPLESS: You don't have anything different?

MR. MANNING: We don't have figures, but we're saying the assumption is that prices would be static. And given the potential to have to import those, a significant amount of imports, and take them from someplace else, there's a potential cost impact that wasn't cautioned or accounted for in the report. We don't have a number on it, though.

PRESIDING COMMISSIONER SHARPLESS: Before you go on, could I ask whoever be appropriate person is who handled that part of the report to respond?

DR. KOLB: I recall that we established supply curves for jet fuel and diesel fuel using, I believe, Gulf Coast prices plus transportation. And we did not model a higher cost of supply function with additional volumes of that material coming out. So we did have any slope to our supply curves.

PRESIDING COMMISSIONER SHARPLESS: Is there a way to put a slope on supply curves?

DR. KOLB: Well, I think it would be useful to get some information from WSPA on this regard.

PRESIDING COMMISSIONER SHARPLESS: It seems to me like they don't have the information; they want some kind of contextual cautionary stuff. It would be helpful if you had the information. Do you know if you can get the information?

MR. MANNING: We're happy to. We'll follow up and find out what we can get and share that if we can.

COMMISSIONER MOORE: Do you know what the slope of that supply curve is? I mean, do you have an estimate in your mind?

MR. MANNING: Being a lawyer and not an economist,

I'm not going to venture a guess.

PRESIDING COMMISSIONER SHARPLESS: It never stops an economist, only a lawyer.

MR. MANNING: It usually doesn't stop a lawyer but in this case I'm going to discipline myself.

COMMISSIONER MOORE: Well, there are all of us who'd just assume can openers and things when the going gets rough.

MR. MANNING: Yes.

COMMISSIONER MOORE: Mr. Hirshfeld, your response is that basically you simply didn't assume a supply curve; you just assumed it was flat?

MR. HIRSHFELD: Yes. And the one thought that we have on this, and it certainly is far, far from last work, is that the need to import jet and diesel would arise from a turndown in crude runs in California which would be needed to accommodate imported gasoline blend stocks. So it's in some sense a second order, it's a second-order effect. Not that I mean it's unimportant.

But, okay, so there's some crude oil in this line of reasoning that is no longer being processed in California. It's got to find a home somewhere else. It's going to be processed someplace else.

COMMISSIONER MOORE: Let me stop you for just one second. Help me with this. Two things: One, jet A is kerosene, isn't it? I mean it's a petroleum derivative, but it's kerosene. It's not a blended stock, as I understand it, one and two. Isn't the supply curve on this -- I am sorry -- isn't the demand curve for this relatively elastic? I mean, that it doesn't really factor into this kind of analysis? I mean, those two points?

I'm trying to get the magnitude of why are we going to spend -- you're going to send your economists out to get new facts in. I'm just wondering, do we really have a point that we're making here?

MR. SCHREMP: Commissioner Moore, if I might interject for just a moment, please?

COMMISSIONER MOORE: Gordon.

MR. SCHREMP: Mr. Manning, is your concern with the assumed value of importing jet fuel and diesel -- what's the main concern? Is it the jet fuel costs are underrepresented, or the diesel costs?

MR. MANNING: I think both are underestimated because that's about 171,000 barrels a day shortfall under one case, I think, with no cost compacts. That's what we understood.

MR. SCHREMP: Okay. For the Commissioners and the rest of the people in the audience, the results we present on Table 1, for the various cases, in the intermediate term there is only one of those cases that involves the importation of additional jet fuel. And that is of the one-pound ethanol waiver.

MR. MANNING: Right.

MR. SCHREMP: In the long term, there is no additional imports of jet fuel in any of the cases presented in Table 1.

For diesel fuel, maximum importation of additional diesel would be 50,000 barrels a day for ethanol cases in the intermediate term and about 20,000 barrels a day in the long term.

So if we are talking about a significant change in the assumed cost, you know, I think we'd have to look at it in terms of those --

MR. MANNING: Intermediate case for --

MR. SCHREMP: -- those volumes.

MR. MANNING: Yes.

PRESIDING COMMISSIONER SHARPLESS: Which would say that we need some more information in order to do that.

MR. SCHREMP: Yes.

PRESIDING COMMISSIONER SHARPLESS: It might be a point well taken, and we would certainly be interested in the information that you have.

MR. MANNING: That's fine. We'd be happy to get that to you.

PRESIDING COMMISSIONER SHARPLESS: Okay, great. Next?

MR. MANNING: The next point is that the report acknowledges that that there are not enough ocean tankers to transport domestic blend stocks, oxygenates, jet fuel and diesel fuel necessary, but that this point is not quantified. In other words, there's a potential for the need for construction of new tankers, Jones Flag tankers, to transport this in the United States. And there is no cost estimate on what that impact might be and how that might play into the scenarios.

PRESIDING COMMISSIONER SHARPLESS: You mean the need for additional tankers?

MR. MANNING: The need for additional tankers.

PRESIDING COMMISSIONER SHARPLESS: I thought --

MR. MANNING: I'm sorry. Go ahead.

PRESIDING COMMISSIONER SHARPLESS: I thought Mr. Vautrain -- we had a little dialogue going on that -- said that if there were a long-term commitment for new tankers that -- I think he told me eight to ten cents would be the estimated transportation costs. And is that what you're taking issue with?

MR. MANNING: Number one, we're taking issue with the fact that we're concerned about the ability of the market to respond to that.

PRESIDING COMMISSIONER SHARPLESS: Building tankers, period.

MR. MANNING: Right. Number two, we think that analysis is not discussed at all in this the summary, it's not featured, it's not mentioned. And we think it merits a mention in the summary, not buried in the back of the report.

PRESIDING COMMISSIONER SHARPLESS: Yes, it is mentioned in the executive document. Whether it's mentioned in the first half or the second half, I cannot

recall personally. But I know, having read the summaries several times, that it is there. Perhaps not as expanded as you'd like it.

MR. MANNING: Yes. And a large part of our testimony is talking about emphasis and some other cautions that we have about the likelihood of certain scenarios playing out, number one.

And, number two, the fact that these are potential cost impacts that people need to better understand to make a decision. And so lot of the comments that we have generally are about how the summary might be improved to be more conservative or cautious about the likelihood of certain scenarios playing out.

PRESIDING COMMISSIONER SHARPLESS: Well, how do you think that a policymaker would interpret that? How do you think they would determine how much more that would add to the costs that are currently in the CEC document?

MR. MANNING: Well, a number of the factors that I've mentioned that are singled out may be insignificant. But I think the cost items associated with all these and the accumulated risk of all these are the things that we think need to be adequately reflected in the summary. So the fact that --

PRESIDING COMMISSIONER SHARPLESS: Again, most of them are concerned on the intermediate; is that correct?

MR. MANNING: That's right, yes. And, in particular, a number of these associated with the ethanol case which, again, the no-oxygenate case and ethanol cases are really, I think, the ones that we feel are most appropriate to focus on, not some of the other oxygenates which we don't think, and we would think you would agree, are not really very likely, given the unknowns from an environmental and a health-risk standpoint.

PRESIDING COMMISSIONER SHARPLESS: Okay.

MR. MANNING: Thank you.

The potential time to complete infrastructure improvements under the ethanol blending cases is modeled as perhaps two years. We think this may be understated, given past experiences and the amount of time and capital involved with the improvements and, in particular, the environmental permitting process and compliance with CEQA and other laws that tend to drag the permitting time out and can do it significantly beyond two years.

So, again, we're not saying it can't be done been two years. We're saying there's a risk here that it may take significantly longer than two years.

Marginal cost economics is another factor that we think needs to be taken into account. The economic principle that the cost of the last increments of gasoline to satisfy demand could drive the market costs to exceed the average cost listed in the report and that the marginal cost theory needs to be mentioned and taken into account. And, as we understand it, the modeling is done on an average-cost basis.

The other potentially feasible alternatives to MTBE being --

PRESIDING COMMISSIONER SHARPLESS: So on that last point, you would be suggesting that rather than using an average we would be using marginal to cost out all the products?

MR. MANNING: What we're saying is that you have to take into account -- again, when you're framing the issue, you can't assume that average-cost economics are going to be the way the market reflects the price. And, in fact, some economists believe, and we've worked with economists who talk about marginal-cost economics, as driving the cost and price.

And so what we're saying is you need to at least mention the fact that the assumptions in the modeling are done based on average costs. And, in fact, sometimes the costs are driven by marginal costs. And there's a difference.

PRESIDING COMMISSIONER SHARPLESS: But not all of your products are based on marginal costs, are they?

MR. MANNING: That's not the point. What we're saying is that if you frame the entire report and all the assumptions based on an average cost theory, it may mislead people into thinking that is how the prices and the costs are going to be reflected in reality. And, in fact, sometimes costs are reflected based on marginal costs, not average costs. That's the point where trying to make.

And since I am not an economist I can get somebody who can follow up in more detail on that. But economists will tell you that sometimes costs are affected by the marginal costs and not the average costs.

PRESIDING COMMISSIONER SHARPLESS: That's right. But how would it affect what we have stated as the likely costs in our comparison between the oxygenates? How would that statement of fact, those likely costs --

MR. MANNING: It could drive the costs higher, in particular, in the ethanol case. And we talked about concerns over the availability and ability to get blend stocks, the availability to lure ethanol away. And what we have been told by our economist is that the marginal cost could drive the ultimate cost, not the average costs, and therefore that has to be taken into account or at least mentioned.

PRESIDING COMMISSIONER SHARPLESS: Could I have someone from the table speak to that point?

Don't all jump in an at once.

DR. KOLB: Well, our analysis was designed to estimate the costs of an MTBE ban and to give some indication of the difference in costs between the alternative oxygenates. I think what's being suggested here is you want some way of translating our analysis into the market impacts in terms of consumer prices for gasoline.

And in that situation --

PRESIDING COMMISSIONER SHARPLESS: Which takes into a whole myriad of other circumstances, right?

DR. KOLB: That's another ballgame. And the focus of our work was not to conduct a secondary study to try to estimate the market impacts.

PRESIDING COMMISSIONER SHARPLESS: Can it even be done?

DR. KOLB: I suppose so.

PRESIDING COMMISSIONER SHARPLESS: With any great accuracy? No.

DR. KOLB: I don't know. I mean our model has the capability of calculating marginal production costs for various products. But it is not a straightforward exercise to pull that information out of our model because of all the additional enhancements we have in the model to take into consideration the predictive model and the complex model, and all that sort of stuff. So it's not a straightforward analysis. It's not for us to pull that information out of our modeling results.

Can it be done? Yes. But I'm not sure that one would necessarily want to translate our estimates of changes in marginal production costs to projecting what might happen in the market in terms of prices. That's something that we don't generally get into.

COMMISSIONER MOORE: You know, before we take this too far, as I'm understand it, your point is you'd like to have a line in the report that says, "This report used average cost pricing and not marginal cost pricing" --

DR. KOLB: That's right.

COMMISSIONER MOORE: -- "and therefore there could be a difference."

DR. KOLB: Oh, excuse me. We are not talking about pricing at all. What we're saying is the analysis led to estimates of the average costs of production.

MR. MANNING: Right.

DR. KOLB: All right. That's step one.

Step two is to produced from the analysis marginal costs of production. That, you know, takes some doing. But that's a technical matter we don't have to concern

ourselves with. Those marginal costs of production could be extracted from our results. Okay. But going from marginal costs of production at the refinery gate to prices at the consumer level, that's not refining economics. That's not a refinery analysis. Okay.

So there is a two-step -- there are two steps in it.

COMMISSIONER MOORE: I understand. And my point is simply to say that in the case of what you did, in terms of marginal versus average cost of production, because all the runs were done using average costs of production, that they are comparable across scenarios.

DR. KOLB: That is so.

COMMISSIONER MOORE: And that's the value of the report to us, is that we get a common frame of analysis.

What he's asking us to do, unless I miss my point, here is he's asking us to acknowledge that we specifically used average costs of production, as opposed to a report that then took marginal costs of production and translated it to marginal cost pricing at the retail level. And I don't see any problem with saying that.

I don't know that you then go back the next step and say, "Well, we ought to go reinvent the model," because, frankly, from my point of view, you did the right thing. That is, you have given us a comparative pallet, if you will. We can compare apples to apples. And so, acknowledging his point, as I conclude, is not a problem.

MR. MANNING: And again we're not saying remodel it.

PRESIDING COMMISSIONER SHARPLESS: But at issue is that this is a document that's going to go to a group of policy people. And they're going to have to try to figure out the value of these differences. They'll look at our figures and they'll say these are a compilation of a multitude of different factors. Now they are telling us there is a whole lot of additional risks out there that can't be modeled. So therefore I need to understand that. I need to know that. I need to know that there might be a drought, El Niño might happen, a

war in Iraq might occur, a whole bunch of stuff, which happens all the time in the marketplace that we can never anticipate is going to happen.

And you want us to put a cautionary note in the Executive Summary for that. I think we can do that. I'm just not sure how, as a public policy person across the street who's trying to ferret through this information, they are going to use that.

How do they put a value on it? How do they know how to use it? How do we tell them to use it in our report or do we tell them to use it at all?

Do you have any ideas?

MR. KULAKOWSKI: Madam Chair -- I'm sorry. Old habits die hard. Commissioner Sharpless.

PRESIDING COMMISSIONER SHARPLESS: That's okay.

MR. KULAKOWSKI: Mike Kulakowski, for the record, with Equilon, representing Equilon Enterprises.

The issue of marginal versus average, I'm just looking at the report. On page 4 there is a sentence that's almost a throw-away sentence, but it says, "The findings of this study indicate that the cost impacts for consumers are directly related to" -- and that's the type of sentence that bothers me because it's not necessarily the cost to consumers. It's the average cost of production.

One can clearly argue, as we found out in 1996, that the cost to consumers may be very different from the costs, the average cost of production. And I think we're were looking for is a cautionary note to policymakers that says, "If you're importing 40 percent of your blend stocks you're at the mercy of the people who have those blend stocks to import." And it may not be business as usual. And things may reflect more marginal economics than the average economics reflected in here.

It's really a cautionary note, just to avoid the potential bad outcome, when this really happens and people start scratching their heads over why the costs are so much different than were in the report.

That's what we're asking for, in a nutshell.

PRESIDING COMMISSIONER SHARPLESS: Any other comments?

Gordon?

MR. SCHREMP: Yes.

Mr. Kulakowski, I have a question. Would you characterize -- I mean, you gave an example of when a lot of imports came in say, for example, during April-May of '96 when there was a temporary, I guess, decline in production capacity in California. Is that an example of what you're talking about, the market going to more of a marginal cost mode?

MR. KULAKOWSKI: Yes.

MR. SCHREMP: So maybe you could characterize marginal cost reflecting a market that is in transition in some ways?

MR. KULAKOWSKI: I think that the only transition -- I don't know that that's a fair characterization. One could say the cost in that time period you refer to were driven because we had to attract supplies from nontraditional sources, not necessarily because it was a transition.

In many of these cases where we're importing vast quantities of blend stocks and finished materials it's attracting supplies from nontraditional sources as well.

MR. SCHREMP: I believe when I referred to a transition I'm referring to one that is a market that is temporary disequilibrium and then recovering by tracking those additional volumes you're talking about and then will reach a new point of equilibrium. And I believe the results that we present in both the intermediate and long-term, we assume the market has reached a new state of equilibrium after three years and after six years.

So I'm just trying to get at -- I mean is the marginal cost notion worth something in the transition for the market or when it's at equilibrium?

MR. KULAKOWSKI: I think that it may have some impact at equilibrium. I think that if you look at Mr. Hirshfeld's presentation, he said very clearly that marginal costs are different from average costs even at equilibrium in his averaging model.

So again what we're looking for is some sort of a statement to almost inoculate people, that these are the costs, these are the average costs. Marginal costs could be higher and we may see market impacts of very drastically or significantly different from what the average costs are.

MR. HIRSHFELD: If I could?

PRESIDING COMMISSIONER SHARPLESS: Mr. Hirshfeld.

MR. HIRSHFELD: I think there is some benefit in terms of the ultimate audience of this to just be particularly clear on our language in this. It may be that the need is not so much for caveats here and there. It's just being explicitly clear in a language and making the right distinctions between average costs, which of course we've talked about, marginal costs and the relationship between those two. And the distinction that these are indeed costs and not market prices.

PRESIDING COMMISSIONER SHARPLESS: I would agree with that, although I --

MR. HIRSHFELD: Excuse me. And further that the nature all of our analyses is a steady state analysis. We all are working on both an intermediate and a short-term on an average day in an average season and average year. And none of what any of us has done has spoken to transients or disruptions.

PRESIDING COMMISSIONER SHARPLESS: Right. Average daily at peak season levels.

MR. HIRSHFELD: Yes.

PRESIDING COMMISSIONER SHARPLESS: The report says that, perhaps it just doesn't say it well enough, strong enough. I think it's even more than a disclaimer. And I don't think it is a disclaimers against trying to come up with some framework that decisionmakers can use in looking at options.

If you caveat your reports so much that there is no value left in it, then you have nothing to offer policymakers, nothing. And I'm sure that you have been across the street. I know we have been across the street. That doesn't go over too well, you know?

I mean we're here to try to give them the best possible information we can. And we understand there's always circumstances that occur that can change things dramatically that we have not anticipated. My God, if we had a crystal ball wouldn't it be wonderful. We would be in business forever, Michal. But, no, we don't. So we give them the best information we have.

And I take to heart your testimony. I take to heart what Mr. Hirshfeld just said. And I think we probably can improve what we've got in our report to make those things perfectly clear. But I also don't want to dilute the report so much that it becomes valueless. Because then it's "What do you do?"

MR. GLAVIANO: I have a question of the WSPA people. You talk about the risk of the high side. Is there any cases that you know of where the price has actually gone the other way? Have you recovered your production costs for making RFP gasoline in California? And what -- at the stated price of 5 to 15 cents, what has been the average, over the last two years, between CARB gasoline and conventional gasoline or CARB gasoline and EPA gasoline? Have you recovered you cost on that? Is there a chance of a downside for that as well as -- is that a market --

MR. KULAKOWSKI: My antitrust attorney is turning purple over there. So...

PRESIDING COMMISSIONER SHARPLESS: I think embedded in that question was a point, but a sharp one.

MR. KULAKOWSKI: Yes, I think we got the point.

MR. GLAVIANO: The point is that the prices -- the market plays out on the prices, that prices can go down just as much as they can go up.

PRESIDING COMMISSIONER SHARPLESS: Right.

MR. GLAVIANO: A recognition of a risk factor is fine, and we should look at that. The value you place on that is going to be determined on what we think, in our judgment, that risk is.

Now if you are taking about incremental cost in 10,000 barrels of imports or 40,000 barrels of imports being the price of all gasoline is pegged to in domestic production, is a question that we don't have a definite answer on, but say, yes, all gasoline will rise to that price, as it may have risen during the May '96 gasoline tight supply.

We think what we gave them is a pretty good judgment on what we think the price would be without that risk. We could admit that, yes, prices would change, and there are factors that will cause prices to go up. And there are as many factors that will cause them to go down.

And the industry, I think, can tell you they would like to see a return on their investment that, in our estimation, the production of CARB gasoline, that the cost associated with that have not been recovered. And they have not recovered that because of the competitive nature of the industry.

I would like to state I think we haven't recognized here or what has been stated here is there is a competitive force out there. That in terms of an equilibrium of a supply you're going to see competition take place. And you're going to be moving more to the average cost than to the incremental cost. And to think otherwise, I think, doesn't serve the

industry well, because there are many people out there who are very competitive and provide us with a good product at a good price.

That's all. Thanks.

PRESIDING COMMISSIONER SHARPLESS: We'll see.

MR. MANNING: Why don't I move on?

PRESIDING COMMISSIONER SHARPLESS: There are plenty of different perspectives on this issue.

MR. MANNING: Let me just conclude.

Getting back to the way we think the Summary should be formed, a little bit differently. There is a Summary Table, I think it's on page 12 of the report. I think if you look at our written comments and what we are presenting in our testimony, we think the Summary is, obviously, critical. Well, I printed it out off the internet, so maybe the pagination is different, but there is a table in the Summary that talks about all of the different cases for intermediate and long-term and the cost impacts.

What we like to see is the emphasis on the Summary, again, come back to the ethanol case and the no-oxygenate case and also mention, as you discussed earlier, the fact there could be a U.S. MTBE ban eventually on ethanol and what that case would represent in the Summary Tables because it is not in the Summary Table upfront now.

So, in conclusion, we feel the report needs to be altered slightly in terms of the emphasis and to better reflect what we think the upside risk is. We do agree, generally, with the report and also, in particular, with the conclusion that a short-term ban would be catastrophic for the California economy.

And, again, we would like to thank Staff and the Commission who we have worked closely with all through this process. Thank you.

PRESIDING COMMISSIONER SHARPLESS: On the ethanol and no-oxygenate issue that you raise, I wasn't clear exactly what you would like to see in the

Executive Summary. Do you want us to say that it's in the opinion of WSPA that these are the two most likely scenarios?

MR. MANNING: No. I think what --

PRESIDING COMMISSIONER SHARPLESS: Oh, did I misunderstand?

MR. MANNING: We'd like it to say in your opinion, but --

PRESIDING COMMISSIONER SHARPLESS: Well, that's what I thought, but I thought we were trying to be very neutral here.

MR. MANNING: We realize you're trying to be neutral, and we appreciate that. I think that is added to the credibility of the analysis.

At the same time it is hard to be so neutral for all of us to put our head in the sand and not realize the problems with some of the other cases as emphasized by the U.S. Davis presentation today and the information that's out there that everybody knows. And so, yes, we want to look at all the alternatives, but how do we also emphasize, again, for the people who are going to get the report, if they have six or seven options listed and it appears that other ethers are just as good as MTBE, and maybe from a cost standpoint very attractive, how do we frame it so that they don't just lead to that. And that is --

PRESIDING COMMISSIONER SHARPLESS: I have to tell you, Mr. Manning, that that was a very difficult thing for this Committee. We tried valiantly to not go beyond the scope of our report. It's really hard to make sure that people don't take this report without considering the other components. We didn't have the other components at the time we did this report, but without predisposing what the outcome of those would be, to attach any further analysis on the alternatives and which would be the most likely or which would be the best. We tried very hard to do that.

I'm not sure that this committee, although I will have to discuss it with my colleague here, is any more disposed to choose a likely outcome than this report currently reflects.

MR. MANNING: And we appreciate the balance you're trying to perform.

PRESIDING COMMISSIONER SHARPLESS: Thank you very much.

MR. MANNING: Thank you.

PRESIDING COMMISSIONER SHARPLESS: We have two others, so I would like to try to get through them. If we have no other blue cards -- I don't have any other blue cards, but for those of you who might want to comment to the Committee, now is the time to do it.

Duane Bordvick.

MR. BORDVICK: Good afternoon, Commissioners.

PRESIDING COMMISSIONER SHARPLESS: Hi.

MR. BORDVICK: My name is Duane Bordvick, and I am Vice President of Environmental and External Affairs for Tosco Corporation. Thank you for this chance to talk to you today. And I would like to give a summary of some more detailed written comments that I believe were submitted today.

I'm going to give a little bit more of a macro view perhaps than what we just heard. And while some of my comments may be more in the line of policy, we have tried to translate those to specific recommendations for changes to the report in the written comments.

As background, in case some of you don't know about Tosco, we are the second largest refiner in California with about 370,000 barrels per day of capacity. We market in California through a network of about 1700 retail outlets under the brands of Union 76, BP and Circle K.

MTBE use in California has been of high interest and of high concern at Tosco for some time. A little over a year ago in October 1997 we wrote the Air Resources Board recommending that the State take action sooner rather than later to help move us away from MTBE.

Our principal concern then as it is today is the threat that MTBE poses to the state's water resources and the resulting liability such contamination creates for our company as well as the people of California.

We are here to talk about the CEC study. And I would like to mention, as I said before, a few key points that are covered in more detail in our written comments.

We are pleased. We are pleased the State has continued to move forward, and this study represents a significant milestone. We are pleased the study contains a tremendous amount of useful information and analysis regarding the ability of California to eliminate MTBE. And we are pleased the study suggests that getting rid of MTBE will not cause a major disruption in the gasoline marketplace and will not threaten the air quality benefits provided by the cleaner-burning gasoline program. And overall we are just pleased to whole-heartedly support these conclusions.

While we believe the study demonstrates a phase-out is feasible, we believe the study also shows there is no one solution. Tosco, and we believe other refiners, would utilize a combination of options or solutions tailored or fitted to each of the refiner's individual capabilities and circumstances to eliminate MTBE.

These would include initial minimization of MTBE use. Second, using ethanol at various levels where and when advantageous. Third, in the shorter-term, importing gasoline blending components, as has been discussed. And, fourth, designing and building additional refinery hardware.

We suggest this concept of using these combinations at perhaps at different times over the phase-in period be included in the Executive Summary of the study.

Within our own company we see different phase-out solutions for each of our California refineries. Thus, the key to a smooth and short phase-out is maximizing the refiner's ability to utilize all these options. In fact, Tosco has already utilized a couple of these options, which I would like to discuss in just a few moments.

Another key to maximize option availability has already been discussed today, and that is passage of HR 630, Bill Bray legislation, which as already has been discussed by Mr. Schremp very effectively, about 70 percent of our California gasoline supplies has this minimum oxygenate mandate.

These conclusions with result to the oxygenate benefits of HR 630 are supported in the CEC study. Another change, however, we would recommend to the study is that the study be even stronger in stressing the importance of HR 630 for any phase-out scenario.

The study suggests three timeframes for elimination of MTBE. You really don't conclude which one is best, other than certainly it's clear the immediate ban is as unacceptable consequences. We certainly agree that an immediate ban is not the right solution, but we do believe we should act sooner rather than later.

We are pleased to support a phase-out target of no more than three years. Are we optimistic? Yes, you bet. We are for good reasons.

First, we're motivated to get rid of MTBE. Second, we believe our industry has demonstrated an ability to be creative, responsive, responsible and to get the job done. Third, we believe that using a combination of options, as I mentioned earlier, will create opportunities to save time and money.

Lastly, and probably most important, we believe with a team effort of government technical expertise, our own employees' skilled labor needed to build the necessary hardware and the help of environmental and community groups, we can get this done within three years.

As a comparison, the much more complex Phase II program took a little over four years.

Does that mean that all the hardware changes necessary will be completed within three years? No, not necessarily. As I mentioned before, as a combination of options,

you may find yourself importing more products at the beginning, tapering off as you build, phase-in new hardware.

With regard to cost, the study estimates capital and annual cost under various scenarios. And I don't know what is correct. I do know the numbers will be subject to much debate -- it already has taken place. But, in general for all the cases, the report is coming up with capital and annual costs that are much less than the CARB Phase II gasoline program. And I can at least feel comfortable that elimination of MTBE is not of the same magnitude as CARB Phase II.

in addition to costing much less, we believe there is a direct economic benefit to our company and our industry that was not the case for Phase II gasoline. If MTBE isn't in our gasoline it can't get into the environment. Simple. We have eliminated future clean-up costs and other liabilities which could be severe.

Does this, in fact, mean it's a pay-out project for us? Well, perhaps. Perhaps so. And I'm sure we have some debate on that, but as we heard from Dr. Chang, that if you look at the numbers that possibly are the result of MTBE in the environment, you could conclude it is a pay-out project for our industry.

As I mentioned before, we have taken some steps ourselves recently to get the ball rolling. In addition to pushing hard for HR 630, during the last year we have taken some direct steps at reducing MTBE use. In April of this year we began a program to supply nonMTBE gasoline to our 76 stations, our Union 76 stations in three counties in the Bay Area.

The program, which uses an ethanol-blended CARB gasoline has met with very, very positive consumer response and has demonstrated that ethanol can play a role in eliminating MTBE.

Earlier this week we announced an extension of that six-month pilot program through the winter. And, in addition, we have decided that all of our unleaded regular grade

gasoline in the Bay Area produced at our refinery in Rodeo will be produced without MTBE or without any oxygenates at least through the winter. At the end of the winter we will re-evaluate that program.

These are just two examples of how using the options to start the phase-out of MTBE.

PRESIDING COMMISSIONER SHARPLESS: Before you go on.

MR. BORDVICK: Yes.

PRESIDING COMMISSIONER SHARPLESS: That point about re-evaluated after the winter, we get into the ozone summer season. Would it have anything to do with your reformulation being able to meet the standards in warmer temperatures?

MR. BORDVICK: Well, sure. It certainly has to do with -- gasoline demand has to do with the revapor pressure. It has everything to do with that.

PRESIDING COMMISSIONER SHARPLESS: So you have not supplied in a market area reformulated gas using either no oxygenates or an alternative oxygenate during the summertime or you have?

MR. BORDVICK: Oh, yes, we have. We have. As I said, beginning --

PRESIDING COMMISSIONER SHARPLESS: Then why do you need to re-evaluate? Is it just a question that you're expanding the market to a larger area?

MR. BORDVICK: Yes. Things change. For example, our evaluation of the program we began in April, which was throughout the summer months, a six-month program, we were blending with ethanol without blending with MTBE. And it was partly just a matter of what kind of acceptance was this going to have. We were going to run into problems in transportation or distribution, etc. We found none.

So I would anticipate that part of the program could be extended. There is only so much you can do until you make some equipment modifications or make some other

commitments. So, as we have discussed today, the market changes. We have to consider what our demands, supply and prices. All those are factors that have to be considered.

Well, let me just summarize. I was just trying to make the point, though, there are a number of options that need to be considered. It isn't all don't at once. We are not selecting an intermediate or a long-term. Those are just labels. We are just saying there are a combination of things one can do to minimize the period of time to phase out MTBE.

So we think the study is a good ones. It determines and it shows a phase-out is feasible without consequences, unacceptable consequences. And we believe if we don't continue to move forward and if we acted later rather than sooner there will be an acceptable environment and economic consequences.

We stand ready to help. And we would like to meet, if that's appropriate, with the Staff to discuss our comments in more detail and translate some of what I have said today and what we have said in our written comments into specific changes or comments that could be made in the study itself.

PRESIDING COMMISSIONER SHARPLESS: Thank you very much. I would say that, again, some of the issues you have raised are policy issues. We do have a Fuels Report that is paralleling this report. We are trying to keep this report fairly well focused. We will consider some of the policy implications in the Fuels Report, which I think is more appropriate to the policy discussion and issues.

Mr. Glaviano, you had a question?

MR. GLAVIANO: Yes. Yes, I did. Looking in the Fuels Report, would the passage of an HR 630 be the center piece, in your estimation, to make it easier for you to do the things you are talking about?

MR. BORDVICK: Well, it certainly is a key. I don't know if "center piece" is the right word, but until we eliminate a mandate which affects 70 percent of the gasoline produced the state and given the infrastructure of distribution and transportation we have in

the state, it really makes it very difficult to move completely, to move very far away from using MTBE in our gasoline. And so I don't know if "center piece" is the right word, Tom, but we have always said from the very beginning the federal legislation is a key.

PRESIDING COMMISSIONER SHARPLESS: Mr. Bordvick, would you agree that some of the alternatives we looked at in the report, such as TBE and ETBE and TAME are not going to be the likely choices that a refinery such as yours would consider as an alternative?

MR. BORDVICK: I can speak for our refiners. I would agree those are not alternatives we would look to. I'm just fearful of consequences that we might determine that some time later they might have some impacts.

We would like to go to a condition where we are not adding ethers. Again, we think ethanol will continue to play a role. And some of our gasoline would be produced with ethanol, some without. It would be tailored to each of the refineries' particular circumstances.

PRESIDING COMMISSIONER SHARPLESS: Do you share the concern of the previous witness, that the CEC report ought to be modified in the Executive Summary to acknowledge some of the uncertainties that could affect retail prices or supply prices?

MR. BORDVICK: Sure. I don't have a problem with that. We're members of WSPA. We support WSPA's comments. I think those are all valid comments that were made.

I think, as you pointed out, some of our comments are more from a policy position, which is Tosco's opinion. My only comment would be we have heard a lot of good comments regarding how the study could be improved, the many, many, many factors that could be considered and the much analysis that could be done.

I only suggest if we do the same thing for California cleaner-burning gasoline, we still be making studies, and you wouldn't have adopted the rule when you did. At some point you just have to say --

PRESIDING COMMISSIONER SHARPLESS: We did a lot of studying on that rule. That wasn't an overnight rule.

MR. BORDVICK: You did. It was not.

PRESIDING COMMISSIONER SHARPLESS: Many people in this audience might remember that process.

MR. BORDVICK: Well, I certainly do. I certainly do.

PRESIDING COMMISSIONER SHARPLESS: Yes. Thank you.

Okay. Thank you very much for your comments.

MR. BORDVICK: You're welcome.

PRESIDING COMMISSIONER SHARPLESS: And we will take a look at your written response as well.

Cal Hodge. Oxygenate, the Fuels Association.

MR. HODGE: Thank you, Commissioner Sharpless. Good morning. I'm Cal Hodge. I'm President of A Second Opinion, Incorporated. Today I am representing the Oxygenated Fuels Association. Terry Wigglesworth, the Executive Director, came ill came early this week, and so what you have before you is her resource person standing up and giving the testimony.

Basically we are concerned about some of the outcomes of the study because the oxygenated fuel components replaced or dilute many of the toxic compounds historically associated with gasoline emissions. In so doing they improve the combustion performance of the motor vehicle fuels and thereby significantly reduce automotive emissions and air pollution.

Our member companies produce and market most of the oxygenate compounds used in California's cleaner-burner gasoline. And methyl tertiary butyl ether, MTBE, has been the oxygenate of choice because it works and because it's cost-effective.

I'm not going to read all the wonderful things that CBG has done for the state of California, but it would not have done it without MTBE's help. It's in my written comments. But we appreciate the opportunity to present our comments. And we request that our written statement become part of the official record. And we likewise request the official record be kept open for 30 days so additional information that the Commission may require can be provided.

We think the Staff is to be commended for its efforts in the development of this comprehensive report. However, now that we have seen the implications of some of the assumptions that were gathered -- and, by the way, when you did this report you gather assumptions, then you run your models and you look at the answer and you say, "Is this right? Is this wrong? Is there something we need to adjust?"

And that's what we want to talk about now, some of the things we think we probably should consider adjusting. You know, you're threatening to replace one of the most successful air quality improvement programs in history. The alternatives you are considering are not proven, nor as extensively health tested as MTBE, like Dr. Chang said this morning. And they have the significant potential, we think, to cause air quality degradation.

We think one of the guiding principles is that you accept absolutely no backsliding or degradation in air quality. And you should insist that any alternative components demonstrate performance equal to or greater than that of MTBE.

The other thing we are concerned about, you have heard people talk about having to make additional investments. Suppose you found the perfect substitute. You found something that worked great. Are you sure you could get somebody to invest in some

Jones Act tankers? How many of those Jones Act tankers are double hulled that you're relying on?

Can you get somebody to invest in this equipment after you have taken a program that is working and because of the excitement coming out of the media, discarded it to fear and emotion rather than science and facts?

We are also concerned that you seem to be relying upon the flat-mode model runs of the predictive model to develop your least-cost scenarios. The reason we are concerned about that is refiners worked very hard to get the right to average. They even went with more stringent specifications so they could average. And we don't think your modeling has been able to capture the difference between average and flat, because why would it be economic six years from now to run against a flat-mode model, whereas today people are running against the average?

So we think you probably should skew your results towards looking at the average mode as the more realistic case. There is a table in my written comments that show the average and flat side by side. And you will notice there is a pretty good bias towards the flat being the lowest-cost result.

Now we are also concerned, as WSPA mentioned, about the availability and reasonable cost of imported blend stocks, Alkylate. If you assume they are available you are assuming that MTBE can be replaced. But we think that tightening world gasoline quality specifications make these assumptions at least questionable.

I am now a consultant. Earlier I was working with a refiner, and I have talked with both these gentlemen over here about this source of product. The refiner I worked with did provide reformulated -- or clean-burning gasoline for California. However, that was when we were running under the simple model.

Now we are running under the complex model we haven't shipped any clean product to California. And one of the reasons for that is it would affect the crude run at our

refineries. We would have to buy sweeter crude to free up gasoline for California, which means the cost of that gasoline would be considerably higher than what has been modeled in your supply curves.

We heard John Lynn earlier this morning talk about the Highway Trust Fund distribution problem. We think you should take a look at that.

We also think you need to worry about some off-balance sheet emissions benefits. The gasoline you're using has significantly reduced combustion chamber deposits which have caused even lower emissions than what you are anticipating. We also know that MTBE versus aromatics, you are going to get a difference in greenhouse emissions, in favor of MTBE. And we're also concerned about particulate matter emissions that have actually performed better than anticipated.

And you need to match these when you run your alternatives. We don't see anyplace in the model where that has been picked up.

On the MTBE supply price curve that was used in the study, I found it interesting that nobody claimed to own that this morning. And the reason I find that interesting is that it is a traditional, upward sloping supply price curve. But your study is looking at how do I reduce MTBE demand.

When you have a commodity that has established supply and you suddenly reduce the demand for that, you don't go back down the curve the same way you came up. You have a tremendous price change for a very small volume change. And I think what the Commission should do, and I think you can do this fairly easily -- Dave, correct me if I'm wrong -- is you have spreadsheets where you have done some analysis afterwards. I think it would be interesting to plug in your lowest-cost MTBE in those spreadsheets and see if it significantly changes your answer. Because when you stop using MTBE you no longer have an upward sloping supply price curve.

Now we are confident that once you go through all this stuff you will continue to find that an immediate phase-out is a problem for California. But we think you are also going to have some economic problems long-term.

And, finally, OFA is proud of the role our industry has played in helping provide the citizens of California with the cleanest air that they have breathed in the last 50 years. We think this is a significant accomplishment and we think you should be very cautious about discarding it by assuming you can solve the problem.

PRESIDING COMMISSIONER SHARPLESS: Thank you, Mr. Hodge.

Gordon, would you like to ask any questions or comment on any of the statements made?

MR. SCHREMP: Yes.

Mr. Hodge, I had a question on your comment on averaging and flat limit mode of the predictive model. I think you mentioned why would refiners go to the flat limits if they are using averaging out; is that --

MR. HODGE: Yes.

MR. SCHREMP: -- is that paraphrasing you correctly?

MR. HODGE: I think that's a good question. It's a good paraphrase, Gordon.

MR. SCHREMP: From our analysis it is clear to us that currently we find the majority of refineries are using the flat limit mode of the predictive model and only a couple are using the averaging mode of the predictive model. Does that in any way impact your viewpoint?

MR. HODGE: I had other information. And also I know when I was actively involved in providing product for you, we kind of banked things so we could average later if we needed to.

The first batch, I guarantee you, met everything, because you didn't know when you were going to ship another batch. But I had heard you were averaging more, and I may

have misinterpreted something that I heard. That would soften that a little bit, but I still know when it's midnight and you have a batch of gasoline to ship and it's off on one or two specifications, you're going to want that averaging mode available. And a model like Dave has used here will not capture that need.

So you need to -- I still believe you need to put more emphasis on your higher-cost range that's predicted by the average mode because your model is an average model, rather than the flat model.

PRESIDING COMMISSIONER SHARPLESS: Mr. Hodge, you said you would be supplying the Committee with some additional information?

MR. HODGE: You have a copy of our comments.

PRESIDING COMMISSIONER SHARPLESS: Okay. So it is the testimony?

MR. HODGE: And if you have additional questions we will be happy to supply that.

PRESIDING COMMISSIONER SHARPLESS: No. I think my question went more to whether or not you were going to provide additional information that the Staff, the contractors or the Committee had not yet seen.

MR. HODGE: Well, I think early on we made some comments about the CARBOB availability and the Alkylate availability. And if I were running your case I would assume your 50,000-barrel-a-day Alkylate case, you might have a chance of having that available, but when you start running a hundred thousand barrels a day or 175,000 barrels a day, I would reduce the probability of those significantly.

I don't really have additional information to add at this time unless you ask for something for us to look at, and we will study that and get it back to you.

PRESIDING COMMISSIONER SHARPLESS: So are you taking issue with the price comparison or cost comparison the report has?

MR. HODGE: Yes. I think your clean component imports are too optimistic.

PRESIDING COMMISSIONER SHARPLESS: But you don't have a --

MR. HODGE: And I think the MTBE case should be priced out at a lower value because you are going down the supply price curve instead of up the supply price curve.

PRESIDING COMMISSIONER SHARPLESS: The MTBE is what you say?

MR. KOEHLER: The MTBE, yes.

PRESIDING COMMISSIONER SHARPLESS: On that would be the base case?

MR. HODGE: And the HR 630 case.

PRESIDING COMMISSIONER SHARPLESS: Okay. The HR 630 case.

MR. HODGE: Most of your other cases priced MTBE out at your bottom price range?

PRESIDING COMMISSIONER SHARPLESS: Um-hum. And we have already had a discussion about the tankers, so perhaps some of that discussion gets to the point you were making.

MR. HODGE: Have you factored in the thought that most of the Jones Act tankers are single hull?

PRESIDING COMMISSIONER SHARPLESS: No, I don't know. I will have to ask Staff if they have factored into that.

MR. VAUTRAIN: I was certainly aware they were predominantly single-hulled. The new designs are double hull.

PRESIDING COMMISSIONER SHARPLESS: Right.

And your point being?

MR. HODGE: The point being that adds additional environmental risk to the state of California.

PRESIDING COMMISSIONER SHARPLESS: Okay. Thank you. Thank you very much.

I believe Donald Bea from the Chevron Products Company wanted to testify.

MR. BEA: Commissioner Sharpless and Commissioner Moore, I'm Don Bea from Chevron Products Company. And what I would like to do is just sort of supplement some of the comments made by Mr. Manning and also by Mr. Hodge.

And this particularly has to do with the blend stock supply situation. This is an area we think has a major shortcoming because it sort of implies that a lot of this material is available on a worldwide basis, and we have difficulty believing that's the case based on our own experiences.

There are several things that are happening in the world now that is going to impact that. One, we talked about earlier today that the change in specs in motor gasoline are occurring in Europe.

There are major changes occurring in the Eastern United States both in the federal gasoline, which the Phase II effects come into effect in the year 2000, but also a number of areas are implementing lower sulfur standards right now. Atlanta, Georgia and Birmingham, Alabama in particular, but the EPA is looking at a longer-term at lowering sulfur contents all over the United States and particularly in the East.

When this happens people are starting to look at their low-sulfur components to keep internally and not to send them someplace else. And one of those components obviously is Alkylate. And so they are going to look at that and they have to minimize their capital investment to meet these future standards.

So the question is is this material going to be available is highly problematic.

The second part of that has to do with -- I guess on the supplement on that, on the Alkylate part that prior to our investing a large amount of money to satisfy the Phase II gasoline regulations in California, we went looking on a worldwide basis to find if there was Alkylate available we could tie up on a long-term basis. We found about 2,000 barrels a day that might be available in Saudi Arabia, and that was it. So I'm wondering where all this extra material is suddenly available at. This is something we were seriously looking for.

The second part has to do with the CARBOB availability and of course a major component of that is Alkylate, as has been pointed out. Purvin and Gertz develops what they call their CARB index which sort of looks at various refineries and their capability of producing California gasoline. But one of those refineries on that list happened to be our Pascagoula factory which had a very high CARB index. I can tell you its ability to make any kind of gasoline for California is zero and it's 000. So I'm having questions of how you can come up with some kind of factor and say whether you can actually do it or not.

Another one that was on there was an Amoco refinery in Texas City, which had a very high CARB index. We know they specialize in producing a very clean premium gasoline that they get a high value for in the market which they call a crystal clear. That is made up of a high volume of Alkylate. And you can't tell me they are going to send Alkylate to California to mess up their marketing strategy, which they make a lot of money at. So I'm questioning how these things are coming into play.

I guess the bottom line is we think another case needs to be run which reduces the availability of blend stocks to a really low level -- when I say "low level" I'm probably talking in the area of 10,- to 20,000 barrels a day total -- and see what the impacts that has on some of these cases. Because some of these cases are only viable if they have large volumes of materials. So that needs to be addressed.

And when we were talking about the higher levels or the risk that needs to be addressed, that should be pointed out as one of the options or one of the possible problems.

I'm not saying that's a hundred percent probability, but it's sure in the heck not zero. You're looking at ranges here and you have to try to factor those in.

The numbers that you are showing for now are also a probability case. We think it's on the low side. It, again, is not zero, but it's not a hundred percent. The other cases, again, would not be a hundred percent, but they also are not zero. And somewhere in between is probably where the real number is. But somebody needs to know what kind of ranges we are talking about.

Just to make life more interesting, we were talking about jet a little bit earlier, and I just thought I would throw a little bit of information on that issue. And I agree with Gordon, it only shows up in a few cases where there was a shortage of jet and diesel, and that was where the crude rates had to be backed out.

But the way the market sort of works today is the U.S. -- I will talk about jet right now. The West Coast jet prices tend to run lower -- I shouldn't say lower, but tend to be less than the U.S. Gulf Coast prices plus freight. And so the California tends to be in balance. When there is a shortage of material the West Coast prices go up and the prices get high enough for somebody to move material from the West East -- Gulf Coast -- excuse me -- to the West Coast.

Now what we were saying in these cases where I have got a built-in shortage in California, now what is going to happen is I have got to -- my price in California has to go up to a level that is going to encourage somebody to move that material from the Gulf Coast. When that happens that changes the whole market, so the value of the whole market has gone up. And that has reflected in the cost to the consumer in California because that will be the jet fuel. And so that has got to be reflected in those cases, and it wasn't. And that is the point we were trying to make.

The same thing happens with diesel, and that was the point.

Those are my comments.

PRESIDING COMMISSIONER SHARPLESS: Thank you very much.

I wanted to ask Mr. Vautrain, you are the one who sort of covered the issue --

MR. VAUTRAIN: Yes.

PRESIDING COMMISSIONER SHARPLESS: -- of the Alkylates. Do you have any response-comment you would like to make on that issue?

MR. VAUTRAIN: Sure. I have taken some notes. Let me kind of go through this.

As far as the long-term availability, the changes in specs in Europe, this is a moving target. Europe is changing specs, but at the same time their demand is changing and the refining system there is changing as well. It's a fair statement that it is going to change over time.

We actually believe there is going to be a surplus of gasoline in Europe and it will actually get bigger for other reasons as well. There is going to be more dieselizaiton and so there is going to be a surplus of gasoline. And producibility, we think, is going to go on to the East Coast.

So although I sympathize with that, yes, that was just a level of complication we couldn't get into in this study.

As far as Chevron's experience in trying to buy Alkylate, I think there is probably a price issue there. I believe when Don says they didn't find a lot for sale, but at the same time, for a higher price, there is more. This is just the way the world works.

PRESIDING COMMISSIONER SHARPLESS: And you have calculated it at the higher price?

MR. VAUTRAIN: Yes. I calculated it at a price I think is reasonable given the value of Alkylates to refiners, and we took a little time to look at that. There are obviously different ways to look at this. And that volume is not being sold today, it is being

consumed internally by the refiners by and large. And that does raise a risk factor of acquiring the Alkylate.

As far as the CARB index and whether or not Pascagoula or Amoco, Texas City could actually make the product or would, the CARB index is an indicator. And what I was really trying to do was separate refineries that just had no chance from those that are on their face reasonable. Since I had 726 refineries to look at, I couldn't go through and analyze each of them individually, or I'd still be working, and we would never get the project complete. As far as Amoco Tex- --

PRESIDING COMMISSIONER SHARPLESS: So you were the problem.

(Laughter.)

MR. VAUTRAIN: I'm the problem. I work too slowly.

The CARB index is intended as an indicator, not as a proof that a refinery, any particular refinery, could or could not make the spec. There are other refineries that frankly fail the CARB index that we know can make it. I believe it's true that some of the refineries up in the Pacific Northwest that just didn't make the cut that we used actually do provide a bit of fuel. And we accept that as an imperfection in the system. I pointed that out earlier. But it's still a usable system for these purposes, to try to gage its international availability.

And, finally, the point about this case, that Don is interested in at low import levels, I would personally find interesting also. I think any case long-term that involves a large level of imports, notwithstanding whether or not they are available, does cause me some concern also. I really agree with that point.

PRESIDING COMMISSIONER SHARPLESS: Okay. Thank you very much. Helpful.

Our last one, Neil Koehler. So you get to summarize it all.

MR. KOEHLER: Yes. See what I can do. Thank you, Commissioners.

PRESIDING COMMISSIONER SHARPLESS: Could you give your name and affiliation for the record, please?

MR. KOEHLER: It's Neil Koehler. I'm President of Parallel Products, a California ethanol producer, and also here today representing the Renewable Fuels Association, where I sit on the board.

I think the work here today is a very important piece as we try to diversify our fuel port folio going forward. And I know that fuel diversification is one of the Energy Commission's very laudable goals, and I would like to commend Staff on I think doing a very good study, that gives us -- while it's dynamic and I think there are some adjustments, some inputs that probably could be revised and will be revised, some additional runs, but that it is a very useful model that can be used in all sorts of ways for policymakers.

One of the things I believe this analysis so far is clearly indicating is the economic value of oxygenates. Oxygenates are the most cost-effective means of achieving the air quality goals in California. This study has borne that out by suggesting that both intermediate and long-term, that the highest cost alternative to MTBE is a nonoxygenated product and that ethanol is the most cost-effective alternative to MTBE and the other ethers.

I think there are some issues I will bring up that would even show the ethanol economics to be more favorable than they are currently shown to be.

Given the constraints of the model, I think it is a very good approach, but there are some constraints I would like to mention, and maybe as it's refined in the future it could provide some other answers, some of those answers that have been discussed today by other people speaking.

One of the problems certainly in our view with the ethanol case is that the model is an all-or-nothing approach. So in the case of ethanol, for instance, the runs were either a nonoxygenate approach with no oxy, no ethanol, no MTBE or in the case of the ethanol runs,

a model where ethanol is replacing all of the MTBE. I think there probably is in the real world a more probable outcome.

And I would support what the gentleman from Tosco was talking about, that we're probably looking at a mix in a more diverse basket of options as we move forward, so that ethanol would play a role in conjunction with other oxygenates and, probably given the flexibility of the California regulations, in conjunction with nonoxygenated product. If you were to look at that sort of scenario where ethanol would have a 30- to 40-percent share of the market then you would have a very different cost curve, obviously, on the ethanol and a different price and presumably a lower cost.

I don't know how difficult, it would probably be a real reworking of the model, but as we move forward I think that is the more real-to-life outcome that we should somehow try to get our arms around, because having ethanol or any one alternative replace MTBE does tend to skew the economics.

There is also --

PRESIDING COMMISSIONER SHARPLESS: Excuse me, Neil, but let me ask Staff, perhaps Mr. Glaviano.

We did a mix-to-oxygenate scenario, but perhaps it doesn't go as far as what Tosco and this gentleman is implying?

MR. GLAVIANO: No. The mixed oxygenate was ETBE, TBA, TAME.

PRESIDING COMMISSIONER SHARPLESS: Right. Okay.

MR. KOEHLER: Ethanol was not part of that?

MR. GLAVIANO: Because it's not -- in our estimation it's not fungible and I think federal law prohibits it from being mixed with ethers.

Is that correct, Gordon? So it wasn't considered in a mixed bag.

PRESIDING COMMISSIONER SHARPLESS: It was not considered because of other constrictions?

MR. GLAVIANO: Correct.

PRESIDING COMMISSIONER SHARPLESS: Okay.

MR. SCHREMP: But, Commissioner Sharpless, I believe what Mr. Koehler is referring to is if you were to instead of looking at oxygenating the entire supply of gasoline with ethanol, in some of the cases as we did, you look at oxygenating a portion, a smaller portion, 30, 40 percent of that volume. And I believe what Mr. Koehler is stating is if you did that you would not use as much ethanol, and if you would not draw as much ethanol into California it would be at a lower location on the supply cost curve and be a slight cheaper cost. I believe that's what Mr. Koehler is referring to.

MR. KOEHLER: That's exactly right.

And a further refinement, again I know this is something we talked about in some of the meetings leading up to this draft report and it was difficult at the time, but there has been discussion here about how oxygenates and ethanol in particular, when you consider a combination of ethanol with nonoxygenate product, that you would see ethanol, given its octane characteristics in the octane grades, and possibly the use of nonoxygenated product in regular, we're seeing that today in San Francisco. And a useful tool would be able to model that.

Right now what the model says is that in this aggregated, left to its own devices, the model will chose as much ethanol as you will allow it to go in there. So if you do a run, say, modeling HR 630 with ethanol, it's an all-ethanol slate under this model because the model will chose as much ethanol. That's the most economically viable approach, but if you broke that out by grades you might find that to be a little different. Obviously economic and other decisions that the oil companies have made would suggest there are some economic advantages in regular to use nonoxygenated product in San Francisco in the winter.

So it's more complicated, obviously, when we try to translate this tool into real life. And I think both in terms of grade split looks and in terms of trying to combine less than a hundred percent ethanol marketshare might be useful going forward.

There is another issue in the way that the one-pound RVP allowance runs were done. And I think this was just an honest misunderstanding of existing California law, that does allow for the use of 10-percent ethanol blends with a vapor pressure allowance.

That law essentially establishes an alternative specification if you were going to ethanol at 10 percent, that says you trade off the higher oxygen and the intended benefits, environmental benefits you get by doing that with ethanol in exchange for the higher vapor pressure. And you hold all of the other flat limit specifications of California RFG constant. That is the law.

The way the RVP allowance runs were done, it essentially hybridized that by saying you have the one-pound RVP allowance but then you still have to do the predictive model to determine the other specifications. I have discussed this with Staff. I think they have recognized there is a valid issue here and that it would be useful as one of the subsequent runs to look at the RVP allowance in the light that is indicated by existing law.

The capacity issue of ethanol, I think certainly a good job was done indicating the existing capacities in the United States. I think representative, Megan Smith, from American Biofuels was appropriate in talking about some of the opportunities both in the short-term and the long-term for biomass to ethanol here in California and other parts of the United States.

And the one thing I think I understand is there really is no measure given for new production in the intermediate timeframe. And I think it's definitely the case where we will see new ethanol production in the intermediate timeframe of three years, so that there would be potentially more ethanol that could be contributed to the situation than is currently modeled.

I would like to also say there is a large excess capacity of ethanol, under-utilized ethanol today that could be brought to bear on this issue in combination with other solutions. And that many have said that ethanol -- there's just not enough of it out there, and I would take very strong exception to that comment.

I think the Energy Commission report, to its credit, bears out the fact that even with some of the lack of building in new ethanol production that ethanol could be there to meet the demand.

In the report we have talked about the capacity. There is the issue of infrastructure. I believe there is the timeframe of two years. WSPA has actually taken exception with that saying it would be longer.

PRESIDING COMMISSIONER SHARPLESS: Well, if you're looking at the intermediate, that's three years.

MR. KOEHLER: Yes. But I think it was said in the report that to do the infrastructure of the blending terminals would take two years.

PRESIDING COMMISSIONER SHARPLESS: I see. Okay.

MR. KOEHLER: And our view, and I think it's borne out by historical experience, that it would be significantly less time than that if it was a decision that was made by the state to do this.

When there was a wintertime oxygenate program that was first included here in California, a number of the refiners did choose to use ethanol. It was a very quick timeframe from the decision that they decided to make ethanol to when those blending facilities were in place. Those blending facilities, for certainly some of the gasoline, are already in place. So we would say that, and I saw it in Tosco's remarks too, they said the 18- to 24-month timeframe was longer than what they would expect. So that's specifically what we would like to add as well.

That's generally on the specifics. Without dwelling on the policy too much, I just think it is appropriate to note the Energy Commission mandate, as I started with, I think is a very appropriate one. That we do need to look at -- not lose the forest through the trees. We're talking about oxygenates. We're talking about a potential problem with water and the MTBE. But let's look at the bigger picture.

The bigger picture is we need fuel diversity in this is that. We need to promote the use of renewable fuels. We need to look at the opportunities to convert rice straw and resolve one air quality problem to then produce ethanol to resolve another and the economic development benefits that are attendant to that.

And not discredit oxygenates in gasoline because of a potential problem with MTBE in the water. Oxygenates have been overwhelmingly positive in terms of air quality. We have ozone reactivity improvements. We have tailpipe reductions of CO and the hydrocarbons. Significant toxic reductions. In the case of ethanol significant CO_2 benefits. So it's important to recognize that and to not lose those benefits.

In the bigger picture, the issue of HR 630 has been brought up. That's a complex issue. We are, as an industry, not opposed to giving refiners the flexibility in meeting regulations. But at the same time it's very important to understand the oxygen standard was based upon a whole host of very good and sound public policy objectives. Air quality was one of them. Others were energy security. That was touched on by the AMI representative. That should not be ignored.

PRESIDING COMMISSIONER SHARPLESS: Neil, again you're getting into an arena that kind of goes beyond the scope of what we're talking about today.

MR. KOEHLER: Right.

PRESIDING COMMISSIONER SHARPLESS: Actually I invite you back --

MR. KOEHLER: For the Fuels.

PRESIDING COMMISSIONER SHARPLESS: -- for the Fuels Report.

MR. KOEHLER: Yes.

PRESIDING COMMISSIONER SHARPLESS: Because this will all by very relevant. So these are important issues and what you have to say is important.

MR. KOEHLER: Right.

PRESIDING COMMISSIONER SHARPLESS: But if we can keep it --

MR. KOEHLER: Yes.

PRESIDING COMMISSIONER SHARPLESS: -- on to the topic of today, that would be --

MR. KOEHLER: And I hear it. And I only mention it because there was the U.C. Davis that was talked about here today. They did go into some policy recommendations that we feel were not appropriate in regards to discounting of oxygenates. So it's just important we recognize that value.

So I will wrap up and say we have talked about some specifics here. I believe there needs to be the additional run done, and understand that that would not be a huge task to complete. It sounds like there will be a couple of other runs that are appropriate to do as well. The new ethanol production in the short-term, if we could maybe look at building that in, particularly from the biomass side here in California and elsewhere.

And that we look at somehow getting the model to deal with what I think is the probable outcome, which is a more flexible approach that definitely encourages the use of ethanol, but also allows for the ability for refiners to make gasoline without oxygenates and for the continued use of MTBE in some shape or form. With the right flexible regulatory environment we can let the consumers decide. We can let the market decide as to what the most both cost-effective and environmentally appropriate way for the future is.

PRESIDING COMMISSIONER SHARPLESS: Thank you very much. We thank you for your comments.

MR. KOEHLER: Thank you.

PRESIDING COMMISSIONER SHARPLESS: Okay. Well, I lied. There is yet one other person who wants to speak. And if it's short, otherwise we are going to adjourn and we will come back and we will let this roll until Christmas -- no, just kidding.

Ms. Morgan.

MS. MORGAN: I'm Mary Morgan with Kinder Morgan Energy Partners, formerly Santa Fe Pacific Pipelines. And my comment is very brief and it simply is regarding the time period that it might take to make infrastructure changes.

The previous speaker said he disagreed with the two-year timeframe. We are currently involved in the CEQA process at several of our terminal facilities in California today. The two years can either be a reasonable timeframe or even a best-case timeframe because there are many local issues that have to be faced as well in the permitting process. I think the two years is a very reasonable timeframe. I don't think it's fair to say that we could implement those changes much quicker than that.

Thank you.

PRESIDING COMMISSIONER SHARPLESS: Okay. Thank you for that input.

We have come to the bottom of the agenda. We have no other speakers. Would Staff like to make any sort of concluding comments? No?

Mercifully no? Great.

Well, I want to thank everybody who has participated in today's Committee meeting. It has been most helpful to the Committee. Your comments and your considerations will be taken into full account. We will go back and we will discuss the issues that have been raised today. We intend to come out with a recommendation to come to the full Commission. We are looking at the timeframe of December; is it not?

MR. GLAVIANO: December 16th.

PRESIDING COMMISSIONER SHARPLESS: December 16th.

MR. GLAVIANO: Ideally.

PRESIDING COMMISSIONER SHARPLESS: Ideally. So ideally fits into that same category of those other risk factors that you all talk about. But ideally December 16th is a regular business meeting for the Commission, and that's what we're shooting for.

So just look at your web, and perhaps that's the best source of information. Again thank you very much, and we are adjourned.

(The Committee Hearing on MTBE adjourned at 1:30 p.m.)

--o0o--

CERTIFICATE OF REPORTER

I, **GEORGE PALMER,** a duly-commissioned Electronic Reporter of **Palmer Reporting Services**, do hereby declare and certify under penalty of perjury that I have recorded the foregoing **Public Hearing of the Fuels and Transportation Committee's Hearing on MTBE in Gasoline**, which was held and taken at the **STATE of CALIFORNIA ENERGY COMMISSION,** in Sacramento, California on the **13th day of November 1998.**

I also declare and certify under penalty of perjury the aforementioned public hearing was transcribed by myself and proofed by Nancy Palmer, Certified Electronic Reporter and Transcriber by the American Association of Electronic Reporters and Transcribers, Number 000121; and that the foregoing pages constitute a true and accurate transcription of the aforementioned public hearing.

I further certify that I am not of counsel or attorney for any of the parties to said hearing, nor in any way interested in the outcome of said hearing.

Dated this **23rd day of November 1998** at Manteca, California.

GEORGE PALMER
ELECTRONIC REPORTER